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TUBERCULOUS DISEASE OF THE SPINE.¹

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THE clinical features of tuberculous disease of the spine are pain, weakness and muscular rigidity of the spine. The angular deformity is a later sign, although frequently it is the presence of a "lump in the spine" that first calls the parents' attention to the trouble. Paralysis and abscess formation are to be regarded more as complications than as symptoms. In children pain may not be complained of; in adults it is always a feature.

The subjects of this disease are usually weak, pale and unhealthy looking. They tire easily. The

muscular spasm leads to the assumption of peculiar attitudes. The gait is guarded and careful. Sometimes the patient walks with short steps and often largely on the toes to avoid jar. This muscle spasm causes wry-neck when the lesion is in the cervical region, and psoas spasm when in the lower dorsal region, leading to lameness which may be the first sign. In the mid-dorsal region lateral curvature may be present very early.

Normally, hyperextension takes place in the lumbar region and rotation in the dorsal region. These should be carefully tested and any limitation in a child should demand an X ray and a von Pirquet test. The X ray appearances will be dealt with in a special demonstration. They are usually very characteristic.

Diagnosis.

In children one should be very guarded in diagnosing tuberculous disease in the presence of a

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1930.

failure to react to the von Pirquet test. There is a non-tuberculous caries of the spine—often referred to as Calvé's disease—from which the condition has to be diagnosed. The X ray appearance and the course of the disease will help.

Chronic *arthritis deformans* is usually polyarticular and so differs from tuberculosis, although one sometimes sees two or more separate tuberculous lesions in the spine.

In malignant disease the cord symptoms are usually early and pronounced and the primary growth may be found. In enteric fever, syphilis, rheumatism, sprain and fracture the history is important.

In conclusion it must be emphasized that the majority of the patients are brought to the doctor on account of the "lump in the spine" which the mother noticed only that day, the other symptoms mentioned above either having been absent or only considered as of slight importance.

Treatment.

With regard to treatment, there are two schools of thought: (i) Those who advocate conservative treatment—prolonged rest and splinting—and (ii) those who advocate operative fixation of the spinal column. Many articles have been written on the subject and I am sure that the best results obtained to date have been those of Hibbs who practises fusion in almost all cases. But I do not think that any large series has been published showing the results of conservative measures, carried on under the best conditions for a sufficiently long time. Lack of accommodation in hospital and convalescent home has in the past made it imperative to discharge these patients in some form of jacket after six or twelve months.

On looking through the histories of patients at the Royal Alexandra Hospital for Children during the period 1914 to 1924, one is struck with the number of patients readmitted after months or years. Home nursing had been inadequate, immobilization inefficient and only too frequently the child returned to hospital with an increase in the kyphos, a considerable extension of the disease in the vertebra and a lumbar or psoas abscess or more likely one or more sinuses. Since 1924 much more accommodation has been provided at the Royal Alexandra Hospital for Children by the establishment of a convalescent branch at Collaroy. Here children remain until they are cured; sisters and nurses are specially trained for the work and heliotherapy is efficiently practised. Abscesses are uncommon and sinuses are rare. When sufficient time has elapsed for conclusions to be drawn from the figures at the Royal Alexandra Hospital for Children, I think it will be shown that conservative treatment in children is just as efficient as operative treatment. Certainly Hibbs has shown that by his ankylosing operation he is able to shorten the period of recumbency. In older children and adults the time factor

is an important one and so I think that spinal fusion by operative methods should be attempted in all patients over twelve years of age. The principles of treatment are: (i) To eliminate superimposed weight, (ii) to immobilize the diseased part of the spine, (iii) to promote hyperextension, (iv) to improve the patient's general condition.

The first object is achieved by putting the patient to bed and the second and third by suitable splinting. Good food, open air and exposure to sunlight are relied upon to improve the general condition. Whether it is the effect of the ultra-violet rays or whether Gauvain is right in his "theory of varying stimuli," the fact remains that these children rapidly improve in health—they become happy and bright and their muscles increase in tone. The effect is to increase the deposition of lime salts in the diseased area and lead to earlier ankylosis.

As regards splinting, we have almost entirely given up fixation in plaster, principally because it prevents us from exposing the whole body to heliotherapy. We rely almost entirely on the Bradford frame, the double Thomas hip splint (or the long posterior splint as it is sometimes called) and the Rollier straps for the patients in bed and later on the leather or celluloid jacket or Thomas or Taylor brace for the ambulatory patient. For upper dorsal or cervical caries attachments must be provided to prevent rotation and side bending. Our patients are usually kept in bed for from eighteen months to two years and often longer. Skiagrams are taken every four months. If two successive pictures show no increase of the lesion and other signs of healing are present, we have a jacket or brace made and allow the patient gradually to sit up and later to walk about. If no recurrence of pain occurs and the general health remains good, he is allowed more liberty, but he is kept under supervision in hospital for some weeks. He returns to hospital every two or three weeks for several months. If symptoms recur or if the skiagram again reveals increase of the area involved, he is again put to bed. The support is worn for two to three years, making in all from four to five years of treatment.

If there is little kyphos at first, it rarely increases, but if there is very much deformity, it is difficult to prevent more bending when the patient begins to walk about. In the medium cases the deformity is as a rule considerably reduced.

The treatment of lumbar or psoas or gluteal abscesses is to leave them alone unless they become very large, when they should be carefully aspirated and Calot's fluid injected. There is no doubt that the formation of a sinus very greatly reduces the patient's chances of recovery.

The result to be aimed at in all cases of surgical tuberculosis is ankylosis in a good position, and in tuberculosis of the spine, fusion of the diseased vertebrae with deposition of new bone, produces an internal splint which effects a complete cure.

**EARLY SYMPTOMS AND TREATMENT OF
TUBERCULOUS DISEASE OF THE
SPINE.¹**

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In an endeavour to ascertain the early symptoms of tuberculous disease of the spine, I have reviewed the case histories of all patients admitted to the Royal Prince Alfred Hospital diagnosed as suffering from this condition during the last twenty years. Only those cases in which the diagnosis could be considered to be definitely established and where the initial symptoms were clearly defined and described by the patients, have been included in the series.

The series is a small one, particularly as regards children, and one realizes that there may be a considerable margin of error in drawing inferences from such a small number. In addition there are several factors which have to be considered when assessing the value of such data.

The average human is not a profound or even accurate observer. Many symptoms which might bear relation to the initiation in the individual of a tuberculous process may escape his attention or, being noticed, may be explained away on some hypothesis which, however erroneous, satisfies him, and, further, he is liable to forget them when his attention is distracted by the onset of some such dramatic sign as pain or deformity.

As a profession we also are at fault in our frequent failure to study disease in the living text books that come before us. In the presence of an angular spinal deformity and with radiographic evidence of bone destruction in one or more vertebrae we are content to diagnose tuberculous disease of the spine, failing to seek out such data as might prove of the greatest value in detecting this disease in its earliest phases. For these reasons I would ask you to accept with reserve the data I am about to present as indicating the earliest symptoms of spinal tuberculous disease.

Symptoms.

The period between the first onset of symptoms and the clinical recognition of the disease varied in the series from a few weeks to several years and I have made no attempt to describe for you the features which were present at the time of final diagnosis, but in all cases the diagnosis was correct beyond all reasonable doubt.

I have tabulated the analysis of symptoms and will not take up your time by recapitulation.

The analysis emphasizes the importance of recognizing local pain as an early symptom. It was described as the one initial symptom in the greater proportion of adults and children and in conjunction with other symptoms in ten other cases.

TABLE SHOWING ANALYSIS OF INITIAL SYMPTOMS OF PATIENTS PRESENTING DEFINITE EVIDENCE OF TUBERCULOUS DISEASE OF THE SPINE AND ADMITTED TO ROYAL PRINCE ALFRED HOSPITAL DURING THE PERIOD 1910 TO 1929.

Symptom.	Adults.	Children.	Totals.
Local pain only ..	41	10	51
Referred pain only ..	4	0	4
Deformity only ..	4	3	7
Abscess only ..	3	0	3
Rigidity only ..	0	2	2
Weakness only ..	3	1	4
Loss of sensation in leg ..	1	0	1
Sweating on exertion ..	1	0	1
No symptoms (detected on enlistment) ..	1	0	1
Local pain and rigidity ..	2	1	3
Local pain and deformity ..	2	1	3
Local and referred pain ..	1	0	1
Local pain and abscess ..	1	0	1
Referred pain and rigidity ..	1	1	2
Referred pain and deformity ..	0	1	1
Rigidity and weakness ..	0	1	1
Pain, referred pain and weakness ..	1	0	1
Pain, referred pain, deformity, loss of weight ..	1	0	1
TOTAL NUMBERS ..	67	21	88

Initial rigidity and deformity were more common in children, though the small number of the latter makes one hesitate to accept the figures as conclusive.

Most authorities and observers are agreed as to the importance of rigidity as an early symptom in the disease and it has to be remembered that this sign might easily pass unnoticed, except on careful clinical examination where the initial focus of disease is in the mid-dorsal segment of the column. Let me remind you that in the lumbar and lower dorsal segments all movements, except rotation, are freely possible, in the dorsal region rotation is the movement of greatest amplitude, whilst in the cervical region movement in all directions is possible. In seeking for rigidity these local features of spinal movement must be kept well in mind.

A brief word as to the place of radiography in early diagnosis is necessarily merely to emphasize the fact that radiographic evidence is only of positive value. Failure to demonstrate by this means evidence of disease in a suspected early case should not make us discard the diagnosis, particularly in the presence of such signs as rigidity and pain or rigidity alone. Whilst in Melbourne recently, I was very much impressed by a museum specimen of the spine of a child and its companion radiograph (the latter taken of the spinal column itself). Whilst the specimen showed a large caseous patch in one of the vertebrae, the picture disclosed no sign of any abnormality whatever.

In one of the cases of the series tabulated tuberculous disease had been diagnosed clinically, whilst the radiographic evidence was doubtful, the skiagram showing a wedge-shaped vertebra without definite bone destruction. The patient died and autopsy revealed a shell of bone filled with caseous material and a companion spinal cold abscess.

That tuberculous disease can advance far without subjective symptoms sufficiently marked to draw the sufferer's attention to his condition was well exemplified in one case in which the presence of the disease was first discovered when the patient pre-

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1930.

sented himself as a candidate for enlistment during the late war. The examining medical officer noticed a small gibbus and a radiogram disclosed evidence of active tuberculosis.

Treatment.

If the pathology of the disease does not always furnish us with early evidence of its presence, at least it leaves us in no doubt as to the nature of the treatment which it requires. It discloses that we are dealing with an organism which destroys locally and sends its poison products abroad; and that to combat the disease we must minimize destruction and the effects of destruction and provide antidotes for the circulated toxins.

The general measures against tuberculous toxæmia need no recapitulation, but we do need to be reminded of the necessity for carrying out to the full and unremittingly these measures in all cases of tuberculous disease of bone and joints. Efficient fixation of the spine is a prime necessity, but to neglect the general treatment is to neglect the disease in favour of one only of its manifestations.

The fact that tuberculous disease in a bone or joint may die down and be regarded as cured, is no guarantee that it will not recur in a fresh area of the skeleton. I have seen this happen a disconcerting number of times, making me very chary in accepting as proof of the cure of the tuberculous process the fact that a bone or joint lesion has subsided and appears to be completely cured. This experience emphasizes the importance of persistence in the attack on the general tuberculous process in addition to that of our measures against the local manifestations of the disease.

With regard to local measures, we have to remember that the destructive process takes place slowly in a structure which during the greater part of the life of the individual has to combat the effect of gravity. Therefore we must provide local rest and adequate support to the spinal column to minimize destruction and to counteract the unfavourable alliance between destruction of bone and gravity.

For this purpose I believe that our most valuable measure is rest on a Bradford frame in hyperextension. In children I regard this as a paramount necessity. In adults this measure is equally valuable and important, but economic factors and in our big general hospitals a failure to cater for the needs of these patients frequently renders such a course impossible.

Here we have to choose a method of fixation which will provide the nearest approach to the stated optimum, and I believe that in favourable cases bone fixation is undoubtedly the best of such methods. Hibbs's method appeals to me, as I regard it as providing a more mechanically efficient measure of support to the spine than that of Albee.

A well-fitting series of plaster jackets can efficiently protect the spine against the factors mentioned and when operation is contraindicated or refused, is the next methods of choice.

It must be remembered that whilst the wearing of a jacket will protect against angulation, it does not prevent the crushing effect of the superjacent portion of the trunk upon the diseased vertebrae. For this reason it is essential that a patient wearing a jacket should spend as much time as possible on his back.

No jacket can be considered efficient during the active stages of the disease unless it extends from the lowest possible point about the pelvis to the neck, terminating in a well-fitting collar.

When the disease focus is situated in or above the sixth dorsal vertebra, the head must be supported by a prolongation upwards of the jacket.

THE PRINCIPLES OF ARTIFICIAL FEEDING OF THE NORMAL INFANT.¹

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LET US take it for granted that we agree that babies should be fed naturally, if possible, and that none of us will, without sufficiently good reasons, advise artificial feeding. In addition, we agree that each baby should be treated as an individual patient and that none of us should advocate rigid schemes for mass feeding of infants. It may also be taken for granted that the best substitute for breast milk is cow's milk in some form, suitably collected, delivered, stored and prepared.⁽¹⁾ Stated in this way, we intend to include wholesome dried and evaporated forms of milk as well as fresh milk.

The impression still prevails in the minds of some of us that simmering damages cow's milk and that raw milk is superior to boiled milk as a food for infants. The evils arising from the use of raw milk more than counterbalance the germ of truth in this impression. Pasteurization, with the possible exception of the effective treatment of the supplies of large cities, is not a satisfactory solution of the difficulty. We recognize the value in this city of the general custom of simmering fresh cow's milk for the use of babies in a double saucepan for from five to ten minutes. This procedure is a means of the prevention of bowel infections from the milk and also renders more digestible the casein fraction of the protein.⁽²⁾ It should be generally known that curd indigestion should not occur. The adoption of the practice of simmering the mixture will go far towards the prevention of this condition. If sodium citrate is added to a feeding mixture, it should be used only when its use is indicated to prevent curd formation.

The principle of regular feeding need not be discussed fully, though it may be a difficult matter to decide whether a certain baby should be fed every three hours or whether the four-hourly interval

¹ The third of a series of post-graduate lectures arranged by the Council of the Victorian Branch of the British Medical Association, delivered on May 29, 1930.

would be more suitable. Most of us agree with Sir Truby King⁽³⁾ that in any case the baby should have at night an interval of eight hours without food. There is no doubt that regularity is very important for the establishment of habits of sleep and proper digestion and ease of feeding and it is noticeable that babies who are fed regularly, are much happier than those who are fed irregularly. The over-use of aperients for babies said to be constipated, could be avoided by the establishment of the habit of regular defaecation. An increase of the amount of water in the diet or, if necessary, an increase in the proportion of carbohydrate present should be made before aperients are administered.

Injudicious restrictions or alterations in the diet are dictated sometimes by an excess of zeal in detecting abnormal appearances in the faeces, when the infant is thriving in every other respect. The failure to diagnose diarrhoea due to an excess of carbohydrate in the diet, combined with the tendency to regard diarrhoea as an indication to withhold food altogether or to use an exclusive carbohydrate diet, has been known to create serious illnesses out of comparatively trivial beginnings. The use of honey as a cure for thrush is another cause of the precipitation of serious illness. It should be realized that if a baby is not taking any nourishment, he is soon living on a diet that is too rich in fat—his own body fat—and will develop a ketosis very soon. It is not wise to withhold nourishment, especially sugar, for more than a few hours. Weak alkaline fluid, properly used, will control vomiting, unless the vomiting is of cerebral or of reflex nervous origin or is due to intestinal obstruction. Until the vomiting is controlled, of course, food is not retained and a normal baby becomes a very sick one unless prompt attention is paid to the checking of the vomiting. Vomiting leads to ketosis and dehydration, and a vicious circle is soon established. Failure to recognize dehydration leads to disaster. On many occasions lives may be saved by forced administration of fluid and the intraperitoneal route should not be neglected. Blackfan and Maxcy⁽⁴⁾ in 1918 reported the successful use of normal saline solution by this route. Grulée and Sanford⁽⁵⁾ in 1928 described the use of a 5% aqueous solution of dextrose and in 1929 Shohl and Beal⁽⁶⁾ confirmed this work and offered a simple technique to make the method available for the use of every physician. On these occasions dietary details are of secondary importance.

Many babies are given malt and soothing syrups on the comforters in sufficient amount to cause thrush and to raise the carbohydrate proportion of the feeding to such a degree that carbohydrate diarrhoea and colic occur. Because no one has told her differently, many a woman gives her baby a feeding as hot as the cup of tea she drinks and she does not think of the heat as the cause of her baby's displeasure. Grandmothers, neighbours and chemists often interfere in an unwarranted way with the correct feeding of babies. The mothers seldom volunteer information of this description. Discom-

fort is seldom considered by the mother to be the explanation of her baby's restlessness. The feeding usually is blamed as a cause of "colic."

One method of artificial feeding, that is, detailed knowledge of one type of feeding mixture, is not a sufficient armamentarium for a doctor. Each baby must be considered separately and no attempt should be made to impose any standard or stock feeding mixture on a series of babies, if the best results are desired. Unless the feeding is positively harmful to the baby, the doctor should commence with the feeding the baby is getting, correcting the method of preparation or administration, if necessary. If he is anxious to alter the type of feeding, it is useful to use "transition" tables, some data for the preparation of which will be found on page 72 of the Public Health Department's Guide.⁽⁷⁾ By this means amounts of the old food will decrease gradually as the amounts of the new food increase and the change from one type of feeding to another will be made smoothly. Several alterations should not be made in the diet at the same time or opportunities are lost for testing the effect of each step. The use of weak dilutions as a precaution should not be overdone, because overcaution leads to under-feeding, if the baby is not able to take the quantity in the day necessary to obtain sufficient food.

Unreliable weighings are unreliable guides to progress. A baby should be weighed, as far as possible, by the same person, on the same scales, at regular intervals, in similar clothing or without clothing, at the same interval between feedings, to make a comparison of the weights on different occasions carry the greatest value. If the feeding mixture is beyond reproach and the baby is well, do not be concerned if a baby continues to gain an excessive amount, particularly if the baby is not over weight. Do not reduce the feeding for this cause alone, but give more water between feedings. Remember, however, that a large gain in one week succeeded by a small gain the next week may precede more serious evidence of a fat disturbance.

A failure on the part of the doctor to follow up his work by arranging the approximate date of the next consultation will lead to the unsatisfactory position that he is able to see the baby only when things are not progressing favourably and the baby is not in a fit state to stand an increase in his diet. It is much sounder and easier to keep a baby well than it is to let him get ill and then to try to make him better. Until recently at all events a want of detailed precision and inaccurate measurement of powders and fluids led to serious trouble. One must be sure that the directions are being carried out in the manner intended. All that the mother might be told possibly would be that she was to give the baby milk and water. Of course, that is not enough. It is actually a saving of time to write down explicit directions rather than to repeat them verbally and adherence to this principle must minimize inaccuracy and disappointment.

The return of menstruation in the mother is still regarded by some as a reason for weaning. The

truth would appear to be that the return of menstruation is the beginning of the end of lactation. As a rule, however, three or four months may elapse before weaning is compulsory. In the meantime a variable decrease in the milk supply should be expected and assessed by "twenty-four hour" test feeding at least once a week, when practicable. The failure to order complementary feeding and reestablishment procedures in the early stages when lactation becomes insufficient is still very common and to a certain extent it may be due to the fact that it is so ingrained that breast feeding is superior to artificial feeding that the mothers persist with failing supplies for many weeks, although week after week the babies are losing ground. This could be prevented if each obstetrician would instruct his maternity patients in a convincing manner to attend for regular weighing of the babies either at his surgery or at a welfare centre and that he should be consulted if a baby is not making normal progress according to a list of expected weights, calculated on the basis of the weight at birth. As so many of the problems of artificial feeding which are still being solved, require a scientific training for a proper appreciation of the problems and of the conclusions advanced concerning their solution, no baby should receive artificial food unless the person responsible is acting on medical advice.⁽¹⁾

Examples are still encountered of children who go into the second or even the third year of life without being weaned in the night time. The failure to recognize a weaning period for infants fed artificially implies the failure to introduce a proper variety of proteins, fats, sugars and starches at the appropriate times and leads to the exhibition of an insufficiently varied dietary in a pappy, fluid form at a time when it would be beneficial to the infant to be having more solid food. The failure to appreciate the position in respect of the digestion of starch must account for the use of starchy foods for babies less than six months old. Bayliss⁽⁸⁾ states that the viscosity of the suspension medium is an aid to the permanence of colloidal solutions. The presence of one colloid helps another colloid to remain in the colloid state. A very dilute starch or gelatin solution will help to keep the casein of cow's milk in the colloid state and prevent tough curd formation. When barley water is used as a diluent, it is superfluous to use more than one rounded teaspoonful of pearl barley, prepared in the usual manner, to make one pint of barley water in order to get this effect. The energy-producing value of this component of a mixture may be disregarded, if the amount is not superfluous.

Some Theoretical Considerations.

The main problems for the consideration of the medical practitioner are to my mind the water requirement, the theoretical caloric estimates of amount of food, the caloric basis for assessing the balance of a feeding mixture, considerations of the digestibility of the mixture from various stand-

points, chemical and physical, and the criteria of normality of progress of the infant.

It is proposed, therefore, that we should discuss each of these problems. Mineral and vitamin requirements and mothercraft details in care of the food, methods of administration and care of the baby, though very important, will not receive detailed attention on this occasion.

Fluid Requirements.

A baby should get as much water as he needs and the amount varies considerably for different babies and under different climatic conditions. The fluid requirement is not quite the same thing as the water requirement, but for our purposes it is sufficient to discuss the fluid requirement, inclusive of the water requirement. We may accept the breast milk standard of two and a half ounces to the pound of body weight as the minimum fluid requirement and obviously in hot weather the baby will benefit by an increase in this amount.

Authorities agree⁽⁹⁾ that a baby should get from two and a half to three ounces of fluid per pound of body weight per day. We are asked frequently if a baby should be given extra water between feedings and we are liable to be informed that difficulty is experienced in administering the extra fluid we have advised. In cold weather, at all events, there is no need to insist on its administration if the fluid in the feedings fulfills the above requirement.

If the caloric value per ounce of the feeding be smaller than that of breast milk, additional fluid is not essential. The baby will take sufficient fluid with the feeding in such a case in order to get the solid content. An example is instructive.

A baby, three months old, was taking ten ounce feedings of a dried milk dilution. It was found that the baby's mother had misunderstood the directions. She had been accurate in the measurement of the powder, but had measured the water in fluid ounces instead of in table-spoonfuls. The baby was taking twice the amount of feeding intended, in order to get the solid contents. When the error was corrected the baby could not be persuaded to take more than six ounces at a feeding.

Another example will illustrate the other extreme.

A young baby was gaining weight excessively on lactic acid, sweetened, whole milk feedings. For several weeks in succession the baby who was not under weight at any time, was gaining a pound a week at least. The nurse who was feeding the baby, stated that although she calculated that the baby's requirement was four ounces per feeding he could not be satisfied and would not give the household any peace unless he got six ounces or more at a time. This baby was taking the extra solid food because he needed the extra water and, as the protein present was readily assimilable, up to that time he had not shown any evidence of impairment of his digestive system. The caloric value per ounce of the feeding was very much in excess of that of breast milk and when the baby was given the extra fluid required between feedings, he was satisfied and progressed along normal lines on a much smaller amount of feeding.

A consideration of the fluid requirement therefore indicates that it is desirable that the feeding mixture should be balanced to suit each baby as an individual and that the caloric value per ounce of the mixture should be about seventeen or eighteen

(that is, definitely below that of average breast milk). If there is much variation from these figures, an extra factor, the satisfying of the fluid requirement, has got to be studied and this is avoidable. When the caloric value per ounce of a feeding mixture exceeds eighteen, it is necessary to pay special attention to this extra factor.

Theoretical Caloric Estimates of Amount of Food.

The caloric method of feeding infants consists essentially of the allocation to each baby of a minimum daily amount of food, the composition of which is known with sufficient accuracy for one to be able to calculate the approximate caloric value per ounce. The amount is calculated by multiplying the weight of the baby in pounds by a theoretical number of calories per pound, decided upon somewhat arbitrarily, taking into account the age of the baby, the length of the baby, the health of the baby, the deviation of the actual weight from the average weight of babies of the same age and certain other factors. The theoretical caloric requirement so estimated is divided by the caloric value per ounce of a given mixture to determine the quantity of the feeding to be given to the baby in the day to give the baby the chance to gain weight and to make normal progress. The quantity for the day, divided by the number of feedings, will, of course, be the minimum quantity to be given at each feeding. In passing one may point out that if this quantity is not retained by the baby at any one feeding, an attempt should be made to make up the deficiency during the twenty-four hour period. And, further, it should be stated clearly that this theoretical daily caloric requirement should be used more as a method of measurement of the adequacy or inadequacy of the amount of the feeding retained rather than as a method of determining what quantity of the feeding will be offered to the baby.

On the weight and age basis authorities do not vary greatly and the Truby King table of the daily caloric requirements of normal babies may be accepted as a reliable guide in this calculation.⁽⁷⁾ This table applies to normal babies of average weight and when the baby is much under weight or much over weight, it may seem desirable to feed him on the basis of the weight figure midway between his actual weight and the average weight for his age. Sir Truby King has enumerated certain temporary conditions under which the full theoretical requirements should not be fulfilled.⁽⁷⁾ With malnourished babies it is the custom at one of the local infant welfare training schools to start with suitable feedings to supply two-thirds of the theoretical caloric requirement and crib up every two or three days until the full theoretical requirement is reached, and then to go on increasing to the limit of the capacity of the baby.

The caloric estimations were advocated by Sir Truby King for the four reasons following: (i) A comparison of the actual calories a baby is taking, with the theoretical requirement provides a method of convincing an intelligent parent that there is a

need to alter the feeding of a baby in a certain direction. (ii) When a baby is difficult to feed one can balance his needs according to age with his needs according to weight and thus guard against over-taxing his digestion. (iii) By caloric estimation one can arrive at or calculate definitely the fuel value of any food a baby is getting and then compare it with ideal mother's milk and make the necessary alterations. (iv) Caloric estimation serves to act as a guide against underfeeding or overfeeding and also as a check on mistakes and a preventive against mere slipshod guessing when determining and grading ahead the progressive food allowances for baby.

If the excellent "Guide to Infant Feeding," compiled by Dr. Vera Scantlebury,⁽⁷⁾ be used, even these simple calculations may be dispensed with, because tables, in the calculation of which these data have been used, are provided for all contingencies. It saves time sometimes, however, to be able to calculate the caloric value per ounce of a feeding of known percentage composition, when a feeding is being used for which this information is not supplied directly. The caloric value per fluid ounce of a feeding of known percentage composition can be calculated sufficiently closely for our purposes by the following simple rule of thumb. The protein percentage plus one-sixth of the protein percentage added to the carbohydrate percentage plus one-sixth of the carbohydrate percentage added to twice the fat percentage plus one-third of twice the fat percentage gives a figure which is approximately the caloric value per fluid ounce.

In Table I are combined conveniently the Truby King table of daily caloric requirements, the Scantlebury Victorian age-weight line and the average normal expectation of gain in weight per month. The estimated gain in weight during the first month is based on the assumption that the average weight at birth is eight pounds, though we have not any reliable figures available.

TABLE I.

Table of the Daily Caloric Requirements of the Normal Baby (Truby King Table), combined with the Victorian Age-Weight Line for average healthy Breast-Fed Babies (Scantlebury) and the average Normal Expectation of Gain in Weight each Month.

The Age of the Baby in Months.	Number of Calories per Pound of Weight per Day.	Weight at the end of each Month in Pounds.	Gain in Weight each Month in Ounces.
1	50	9.3	20.8
2	50	10.96	26.6
3	50	12.37	22.6
4	47	13.8	22.9
5	45	15.23	22.9
6	44	16.5	20.32
7	43	17.7	19.2
8	42	18.7	16.0
9	42	19.5	12.8
10	40	20.3	12.8
11	40	21.0	11.2
12	40	21.56	8.96

This table will at a glance provide the data for the calculation of theoretical caloric requirements and assessment of the weight indication for normal progress.

There are many other ways of estimating the amount of the diet for normal infants. In 1926 Paterson and Smith⁽¹⁰⁾ stated that "for each pound body weight a normal infant requires one and three-quarter ounces of cow's milk and half a drachm of sugar," made up to two and a half ounces per pound by the addition of water. In 1928 Pearson and Wylie who are colleagues with Paterson at The Hospital for Sick Children, Great Ormond Street, confirmed the value of this simple method of checking the amount of food and stressed the advisability of taking the age as well as the weight into account.⁽¹¹⁾ Another rule of thumb guide (Budin's quotient) is used on the Continent.⁽¹²⁾ One-tenth of the body weight in milk and one-hundredth of the body weight in carbohydrate is the daily allowance for normal average babies. A baby weighing ten pounds, two months old, would get sixteen ounces of milk and 1·6 ounces of sugar per day. Still another rule is that formulated by Powers.⁽¹³⁾ He has shown that if 60% of the calories are derived from milk and 40% from added carbohydrate, the proportional representation of protein, fat and carbohydrate in the total caloric value of most successful feeding mixtures will be observed. A baby weighing ten pounds, two months old, receiving food of a caloric value of fifty calories to the pound would get three hundred calories in milk. (This would work out to about sixteen ounces.) The remaining two hundred calories would be yielded by one and three-quarter ounces of sugar.

Put into general terms, we may state it as a principle that the baby should get sufficient food every day, checked from time to time by calculating the caloric requirements for his age, height and weight.⁽¹⁾

The Caloric Basis for Assessing the Balance of the Feeding Mixture.

It is customary to consider feeding mixtures in the light of the percentage composition, analysed as carbohydrate, fat and protein, and to talk of the upper and lower limits of percentages of each of these basal ingredients. It has been stated frequently that the protein percentage of a feeding mixture for complete artificial feeding should be not less than 1% and not more than 2%, that the carbohydrate percentage should be between 6% and 7% and that the fat percentage should vary between 3% and 4%. There was a time when the usual successful mixtures fell within these limits and there is not the slightest doubt that this rule of Sir Truby King is a very useful guide to the balancing of most feedings, but there is no doubt that babies may be fed very successfully with feedings containing more protein and more carbohydrate at the same time. There is no material difference when we analyse successful mixtures after the fashion introduced in 1925 by Grover Powers, of Yale University.⁽¹³⁾ He prefers to consider the relative contribution of each of the ingredients to the total caloric value. In the first place, he pointed out that if milk is diluted with water, no alteration

is made in the percentage of the total energy supplied by each of the energy-producing contents. Of course, this is self-evident and has been expressed often by those who say: "What does it matter whether the baby gets the water in the feeding or between the feedings, so long as he gets sufficient water?" Powers went on to demonstrate that, if milk is "diluted" by the addition of an energy-producing substance, for example, carbohydrate, the effect is not only to increase the carbohydrate percentage representation, but also to diminish the representation of every other food component that supplies energy. Further, as the amount of the added substance is increased without increasing the volume of the milk, all the other energy-producing substances are "squeezed" to smaller and smaller proportions. Conversely, by removal, as in skimming some fat is removed, the reverse effect is produced. Not only does the proportional representation of the fat diminish, but that of the other ingredients each increases. So it follows that when one energy-producing component is added at a fixed percentage of the total volume to a series of increasing dilutions of milk with water, a similar "squeezing" of the other components occurs. Of course, if the added substance is added in a constant percentage relationship to the quantity of milk present, dilution with water does not vary the relationship. Powers⁽¹³⁾ showed that one is able to arrange the milk mixtures commonly used in infant feeding into seven groups in ascending protein values. He named these, respectively, the human milk group, the sweetened condensed milk group, the "majority" group, the whey group, the undiluted cow's milk group, the protein milk group and the cow's milk skimmed group. The grouping was effected according to the similarity in the proportional representation of protein, carbohydrate and fat in the total calories. The majority group of Powers is so called because it contains most of the milk mixtures which have proved in practice to be successful and safe, when given to infants over a considerable period of time. The majority group contains mixtures in which the protein contribution ranges from 10% to 20%, the carbohydrate from 75% to 50% and the fat from 15% to 30%. Powers, it will be remembered, states⁽¹³⁾ that "in whole milk modifications these requirements are met if 60% of the total calories are in milk and 40% are in added carbohydrate." Of course, we recognize that as energy suppliers a little more fat and a little less carbohydrate might work just as satisfactorily.

It was thought that perhaps it might be of interest if we analysed some of the figures for final mixtures (with maximum fat content advised), taken from the Public Health Department's Guide,⁽⁷⁾ after the manner of Powers. The results are shown in Table II. It is interesting to note that the A.5 formula (milk three parts, water one part, with added carbohydrate) and the C.5 formula (lactic acid, sweetened, whole milk) are practically identical when caloric ratios are calculated, though they are very dissimilar in percentage composition.

TABLE II.

Table showing the Percentage of Total Calories Derived respectively from Carbohydrate, from Fat and from Protein, in some of the Artificial Feeding Formulas of the Victorian Public Health Department's "Guide to Infant Feeding."

Title of Feeding Formula.	Percentage Composition.			Percentage of Total.			Protein Ratio (by Calories).	Calories per Fluid Ounce.
	Carbohydrate.	Fat.	Protein.	Carbohydrate.	Fat.	Protein.		
A.3	6.7	2.7	2.1	44.7	41.4	13.9	1 to 6.2	17.4
A.4	6.6	2.6	2.3	44.5	40.0	15.5	1 to 5.5	17.3
A.5	6.5	2.6	2.6	44.5	38.2	17.3	1 to 4.8	17.5
B.6	6.9	2.8	2.2	44.5	41.3	14.2	1 to 6.0	18.0
C.1	6.9	3.4	1.4	42.9	48.4	8.7	1 to 10.5	18.7
C.2	7.2	3.3	1.4	44.6	46.7	8.7	1 to 10.5	18.8
C.3	6.9	3.4	1.4	42.9	48.4	8.7	1 to 10.5	18.7
C.4	6.35	1.1	1.1	64.2	25.4	10.4	1 to 8.6	11.5
C.5	8.0	3.3	3.3	43.3	39.4	17.3	1 to 4.8	22.3
Breast Milk ..	7.0	3.5	1.5	42.5	48.4	9.1	1 to 10.0	19.2
Cow's Milk ..	5.0	3.5	3.5	30.2	48.5	21.3	1 to 3.7	19.2

A study of this description impresses one with the fact that the desirable percentage of each of the basal constituents depends on the percentage of the other two basal constituents to a great and important extent.

As protein is essential for growth and repair and the other constituents are used as fuel, it is important in the first place that at least the minimum amount of protein required for adequate development should be included in the feeding mixture in a form in which it is assimilable and in a quantity of fluid which is a convenient quantity to administer to the baby in the day. The amount of breast milk that is taken by the normal healthy baby who is progressing along normal lines, is approximately two and a half fluid ounces per pound of body weight per day. The quantity of protein in one and a half ounces of cow's milk of average composition is the equivalent, approximately, to that present in two and a half ounces of average human milk. The protein contents of the two forms of milk vary from each other considerably in quality and in amino-acid derivatives. It will be remembered that Professor C. J. Martin⁽¹⁴⁾ told us in 1923 that if cow's milk was diluted with water and fortified with carbohydrate and fat so that the modification had similar percentage contents of protein, carbohydrate and fat to those of average samples of human milk, the cow's milk mixture would contain only seven-tenths the amount of lysin and five-tenths the amount of cystin which would be present in an equal volume of the human milk. Further, he showed us how very important these amino-acids were for the promotion of growth.

It is unquestionable that the protein requirement of a baby who is being fed artificially, is more than the amount equivalent to the protein of the human milk that would be required for a healthy baby of the same age and physical development.⁽¹⁵⁾

Chemical and Physical Considerations of the Digestibility of the Mixture.

The higher casein content of cow's milk and its relative indigestibility suggest the adoption of the principle that the cow's milk should be treated in such a way, before the baby gets it, that the casein

shall be prevented from forming tough curds in the stomach.⁽¹⁶⁾ There are very many ways in which tough curd formation may be prevented and it must be remembered that simple dilution with water and simmering is one effective way.

Sometimes it seems desirable that a greater modification of the protein should be attempted and of recent years we have heard a lot about acid milk. It may be of interest at this point to review briefly this question of the acidification of cow's milk for the use of infants.

Certain data in respect of the hydrogen ion concentration of the gastric contents of infants seem pertinent to the subject under discussion. It has been found that peptic digestion begins at pH 4 and is optimal at pH 2.⁽¹⁵⁾ A rennin action on casein (denaturization⁽¹⁶⁾) occurs at a less degree of gastric acidity than does peptic digestion. Casein is well coagulated by rennin at pH 5. Marriott and Davidson⁽¹⁶⁾ used these figures and Dunham⁽¹⁷⁾ states that the optimal hydrogen ion concentration zone of effective gastric digestion ranges from pH 3.5 to pH 5.0. With a less degree of acidity than pH 5, then, the passage of unchanged casein past the pylorus is favoured. The inhibition of the growth of members of the colon, dysentery and typhoid groups of bacilli that occurs at pH 5 and the death of these organisms at pH 4⁽¹⁸⁾ are facts bearing on the antiseptic action of the gastric juices. It would seem, therefore, desirable that we should make an effort to insure that the hydrogen ion concentration should reach at least pH 5 at the height of gastric digestion of an artificial feeding.

In Dunham's chart⁽¹⁷⁾ we notice that the average hydrogen ion concentration for sweet cow's milk is placed at about pH 6.6. Marriott⁽¹⁶⁾ states that the average gastric acidity at the height of digestion for normal infants fed on breast milk was pH 3.75 and the corresponding figure for normal infants fed on whole sweet cow's milk was pH 5.3.

The reason why the hydrochloric acid milk of Faber⁽¹⁹⁾ has so low an acidity as pH 6 is that there are dangers in the elimination of the added hydrochloric acid which also causes scalding of the urine.⁽¹⁷⁾ When an organic acid is used instead of

an inorganic one, it can be completely oxidized in the body and the amount necessary for optimal acidification of the gastric contents at the height of digestion may be added with safety.⁽¹⁶⁾ The choice of acetic, citric or lactic acid is more or less open, though each has some advantage over the others. Orange juice and lemon juice also may be considered when this matter is under discussion.

Marriott⁽¹⁶⁾ states that it is necessary to dilute cow's milk with three times the volume of water to get a mixture that follows a titration curve similar to that of breast milk unless acid is added. The addition of carbohydrates does not affect the hydrogen ion concentration and the addition of cream makes no appreciable difference.⁽¹⁶⁾ With so low a protein percentage as that of a mixture of one part of cow's milk and three parts of water we cannot add much carbohydrate or fat without spoiling the balance and the resulting small caloric value per ounce would make it necessary to use an impossible amount in the day to satisfy the needs of an infant. As two-thirds of the buffer substances of milk are represented by the casein, an improvement in the mixture from this chemical aspect may be effected by the abstraction of casein and the addition of whey as well as by addition of water.

The production of the organic salts of sodium, potassium, magnesium and calcium resulting from the addition of an organic acid to whole milk would appear, however, to be a more attractive method, for, when these salts are soluble, there is no difficulty about their absorption and oxidation in the tissues.⁽²⁰⁾ The formation of these organic salts is tantamount to increasing the amount of hydrochloric acid available for peptic digestion and the stimulation of the supply of pancreatic juice and bile in the duodenum which is brought about by the peptone formed.⁽²¹⁾ Another benefit is the sterilizing power of the hydrochloric acid released and there seems to be an improvement in gastric motility⁽²²⁾ and the emptying time of the stomach is shortened.⁽¹⁶⁾

Now let us turn to a consideration of the size of the curd as a guide to the desirable constitution of the feeding mixture. Brennemann⁽²³⁾ pointed out in 1929 that acidification today was no more popular than alkalization was a few years ago and that the improvement in the feeding mixtures and the better results obtainable today had one factor in common. This factor was that the curd of the milk in the stomach by one method or another had been rendered as fine as possible and he raised the proposition that this may be the most important aim of all. He reported the results of a clinical investigation in which comparable series of babies were fed on unsweetened evaporated milk, diluted to reconstitute whole milk to which was added maize syrup in the proportions advocated by Marriott. To the feedings of one series the advised amount of lactic acid was added and not to the feedings of the other series. Brennemann and his coworkers got equally good results in both series.

Balancing and Grading the Feeding Mixture.

It must have become apparent from this review of the information available concerning the caloric basis of Powers, the gastric acidity problems and the importance of the physical state of the curd that we, as medical practitioners, cannot be satisfied to emphasize simply that one mixture is to be preferred before another because of the percentage composition alone. We may state that, when using a mixture of milk and water, it is seldom wise to add sufficient sugar to exceed a percentage of 7% of carbohydrate,⁽¹⁾ though it is desirable that, short of this figure, the weakened mixture should be fortified with as much sugar as the baby will stand without evidence of colic, thrush or frequent scalding, acid, fermenting stools. The amount of protein necessary for the growth and repair of the body must be included. The amount of fat in the diet is the most variable factor. It varies with the individual baby and from time to time with the same baby. In warm weather a smaller quantity in the day is indicated than on a cold day. If the protein does not entangle the fat in the curd because it is in a finer state or if the fat is homogenized, the fat is digested more readily and may be present in greater concentration with advantage to the baby. We may therefore state that in simple dilutions of cow's milk the fat percentage should vary directly with the digestibility of the protein and inversely with the percentage of protein present.⁽¹⁾ It must be remembered that the fat content of cow's milk is very variable in different samples and at different seasons. It often happens that milk which is considered theoretically to contain 3.5% of fat before dilution, may contain 5.5% or more. Because of these facts, it is wise "to add fat cautiously," as the Public Health Department's Guide⁽⁷⁾ expresses it, commencing with small percentages and increasing the concentration slowly and carefully. Usually the fat percentage should not be allowed to exceed 3.5% in the mixture.⁽¹⁾ The gradual attainment of stronger and stronger milk and water mixtures, with more and more carbohydrate and cautious alterations of the fat content is the process known as "grading."

In general it may be stated that the Public Health Department's "Guide to Infant Feeding" contains references to all the principles of artificial feeding and offers a selection of feeding mixtures to suit all tastes and the needs of all healthy babies and that the accurate use of the mixture selected is more important than the selection of the mixture.

The Criteria of Normality of Progress of the Infants.

The ultimate test of satisfactory artificial feeding is the progress that the infants make. Surely we cannot be satisfied with our results if the babies merely stay alive. Much more can and should be accomplished. Many babies, fed artificially from the first few weeks of life, thrive and develop as well as breast-fed babies do.

A convenient check on progress is the steadiness with which the weight line of the individual baby

follows that of the average healthy breast-fed babies. We have noticed that babies who for one reason or another have been underfed and who have as a consequence become under weight, exhibit the buoyancy of a cork held under water which, when it is released, will shoot to the surface. Such underweight babies, when they are given a sufficient quantity of suitable food, gain weight rapidly and soon reach approximately the place on the weight chart that they would have attained if they had not been underfed. If this does not occur, though the diet is generous and suitable on theoretical grounds, it is excellent evidence that the digestive capacity of the baby is impaired and that this baby is not a normal baby and requires different treatment. In this way we can decide within a few days if the baby is reacting normally and determine whether the baby is delicate or merely hungry.

Though the progressive weight records are valuable, they are by no means the sole guide and in some instances indeed they may be deceptive. The skeletal measurements of circumference of head and of chest and the length of the baby from time to time are supplementary guides. The firmness of the thigh and calf and arm muscles is another important aid. The dappled appearance of the skin and the rosy colour of the face and limbs, the brilliance of the eyes, the ceaseless activity while awake and the perfect placidity when asleep proclaim the happiness and contentment of the well nourished infant. The normality of the mental development of a baby is indicated by the attainment at the correct stages of the successive "milestones" of progress. If a baby is thriving in this manner and takes his feedings with zest and has normal stools, we have every reason to be satisfied with his progress.

An important point to keep before us is that, even though deprived of their natural food, the vast majority of babies will make normal progress if the person who is feeding the baby, is able to give the baby the benefit of the information which is available to every general medical practitioner today.

A Scheme for Keeping Healthy Babies Healthy.

We must recognize that these principles allow great latitude in the selection of the feeding mixture to be used and we may state that any feeding mixture that conforms to the requirements outlined, may be used. If the caloric value per ounce is on the low side or on the high side, if there is a doubt as to whether the baby is taking more of one ingredient in order to get enough of some other ingredient or if there is a personal intolerance for any of the constituents or if it is desired to alter from one type of artificial feeding to another type, careful observation must be maintained and studied gradation of the mixture must be carried out after thoughtful consideration and following a definite plan. The directions must be explicit, the measures of fluids and of powders must be accurate and the directions which are correct at the time when they are written, will soon require alteration as the baby progresses. Further, the progress of the baby must

be decided quantitatively and qualitatively by an experienced person.

The scheme that is suggested is that every general practitioner should make it his business to the best of his ability to superintend the artificial feeding of as many babies as possible in his neighbourhood, seeing each baby at least once a fortnight in the first six months and at least once in four weeks from that age until the first birthday. He may encourage the mothers to attend at the nearest welfare centre for regular weighing and periodic measurement and mothercraft guidance. He may find it convenient to keep an indexed loose-leaf note book in which he may place a sheet bearing identification particulars, birth date and birth weight and a copy of the directions he gives the mother at each consultation and progress notes in respect of each baby. Further, it is extremely helpful to include a piece of squared paper for each baby upon which he may make a progressive graphic record of weight and age and any other details desired. This age-weight line should be compared frequently with one made on a similar piece of squared paper recording the Victorian age-weight line. He should obtain the active cooperation of the welfare nurse and of the mother of the baby and should find the Public Health Department's publication⁽⁷⁾ of great assistance in enabling him to make all his directions "precise and detailed and written."

This scheme is not entirely a paper one. It has been put into operation by at least one doctor for the past four years and it is unquestionable that it increases the facility with which infant feeding direction can be carried out. Further, time may be saved at visits and over the telephone by reference to the loose-leaf book and it is believed that an increase in efficiency has been obtained in the management of each baby as an individual. Certainly a check has been kept and records are being built up which are valued highly by the doctor concerned.

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THE REMOVAL OF TONSILS BY ELECTRO-COAGULATION.

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THE removal of tonsils by electro-coagulation is a method which is becoming increasingly popular amongst medical practitioners and their patients. The amount of correspondence which has appeared in this journal recently indicates that a good deal of interest is being taken in the subject. In fact, to misquote Gilbert, it would seem that:

Operators you would meet
In twos and threes in every street
Maintaining with no little heat
Their various opinions.

Whatever differences in technique there may be, all those who use this method, are of the opinion that the results achieved are satisfactory. There is neither pain nor haemorrhage and the method commends itself to the patient, because he need lose no time from his work or recreation. We all meet in practice patients whose tonsils shriek for removal and who refuse to part with them, either because of loss of time involved or because of the fear of a general anaesthetic. It was for the benefit of such patients that I first employed electro-coagulation and the results achieved were so gratifying that I ultimately discarded surgical measures in favour of it for the removal of adult tonsils.

The method which I shall describe, is one which I have used with success during the past eighteen months. I do not claim that it is the only successful method, nor do I think that minor differences in technique matter very much. It is possible, however, for the inexperienced operator to make mistakes which would result in after pain and haemorrhage and it is to point out how these mistakes can be avoided that this paper has been written.

Any description of diathermy machines or of the way in which high frequency currents are produced, would be beyond the scope of this paper, but as some looseness of terminology exists I shall define briefly what is meant by the terms employed.

A diathermy machine transforms the alternating current from the mains into a current of higher voltage, oscillating one million or more times per second. Such a current in its passage through the tissues encounters resistance and in overcoming this resistance it generates heat. If this current is applied to the tissues through electrodes of large area and the current is regulated so that the tissues are heated only a few degrees, we speak of diathermy.

If one of the electrodes is of large area (the indifferent electrode) and the other small (the active electrode), the current is concentrated in the region of the smaller electrode and considerable heat is generated in the tissue in contact with it. The tissue turns white as its proteins are coagulated and this is followed by a hissing sound as the tissue fluids boil. This is what is known as electro-coagulation. The depth to which the coagulation extends varies with the type of electrode used.

If the active electrode is held a short distance from the tissue and sparks are allowed to play on it, its surface is desiccated. This is known as fulguration and differs from electro-coagulation in that the destruction of tissue does not extend far below the surface (about one millimetre); there is merely a superficial charring. Fulguration can also be achieved by attaching the electrode to the Oudin terminal of the machine. It is not strictly accurate, therefore, to speak of the destruction of tissue by diathermy. Tissue is destroyed only by electro-coagulation or fulguration.

Tissue destroyed by electro-coagulation or fulguration separates from the surrounding tissue with very little inflammatory reaction. The resulting scar is pliant and there is no cicatricial contraction.

The technique which I employ, is as follows: The tonsils are swabbed over with a small pledget of cotton wool soaked in the anaesthetic solution for which one may use cocaine 10% with adrenalin one in 10,000, or Wyatt Wingrave's formula:

Cocaine hydrochloride ..	2·0 grammes (thirty grains)
Morphine hydrochloride ..	0·3 grammme (five grains)
Salicylic acid ..	0·3 grammme (six grains)
Sulphate of soda ..	0·36 grammme (two fluid drachms)
Adrenalin chloride, 1 in 1,000	7·2 grammes (2 fluid drachms)
Distilled water ..	30 mils (one fluid ounce)

The latter is recommended by Dr. Kent Hughes and I have found it excellent. Both tonsils should

be carefully painted. Use the swab gently and if the patient can tolerate it, hold it in contact with the tonsil for a few seconds. If there is any tendency on the part of the patient to gag, paint the soft palate also. I do not find it necessary to spray the throat with anaesthetic. Blanching of the tonsil shows that it is becoming anaesthetic. The painting should be repeated three or four times at intervals of a few minutes. Good illumination is essential. I prefer a head lamp to a head mirror and for this work I use a speclight.

As an indifferent electrode I use of a sheet of zinc 12·5 by 20·0 centimetres (five inches by eight inches). This is held in contact with the patient's leg by elastic bandages. All operators are agreed that the indifferent electrode must be of large area as the larger this electrode is, the more quickly the coagulation is accomplished. Cohen⁽²⁾ uses as an indifferent electrode a specially wired chair in which the patient sits.

I use two forms of active electrode, a straight needle on a curved Cumberbatch handle and a needle bent at a right angle on a straight handle. The latter is useful for getting at portions of the tonsil which are inaccessible with the straight needle.

Having adjusted the electrodes and placed the foot switch in a convenient position, proceed as follows: Sit facing the patient and focus the head lamp so that the throat is well illuminated. Depress the tongue and examine the tonsils and note their size and shape. Their extent may be ascertained better by gentle digital palpation than by sight.

Insert the needle for a distance of three millimetres (one-eighth of an inch) into the part to be coagulated, depress the foot switch and when the tissue round the needle whitens, let up the foot switch and withdraw the needle. Do not withdraw the needle with the current on or sparking will occur, and do not keep the current on till "boiling" takes place.

Using a Watson Mark I machine, I set the primary choke control at 4 and adjust the spark gap so that all four gaps are just sparking. Do not have the gap sparking fiercely. The setting will be different on machines of other makes and even on different machines of the same make. The object is to have the machine set so that coagulation takes place in one second.

The ampèrage used, in my opinion, is not of great import and cannot be used as a guiding factor. Experience has taught me that the best results are obtained by using the following combination: A large indifferent electrode, a weak spark, a coagulation time of one second with a very weak spark.

Decide from the beginning in what way you are going to attack the tonsil and work on a definite plan. If the work is carried out in this way, you will accomplish more than if you work in a haphazard manner.

Use sharp needles so as not to lacerate the tonsil. When bleeding occurs in the course of operation, it is usually due to faulty insertion of the needle

rather than by the coagulation which tends to check it. If bleeding does occur, withdraw the needle, increase the spark gap slightly and allow sparks to impinge on the bleeding point. This will check the bleeding promptly.

The golden rule is not to attempt to remove too much at any one sitting. This applies especially to the first sitting when only one area should be done on each tonsil. If more is attempted, pain will follow. The reason for this is not clear; Cohen thinks that this is because the sensory nerve endings are in the capsule of the tonsil.

At subsequent sittings three areas may be coagulated, but the operator must use his discretion. If by doing three areas they would coalesce, it would be better to do only two.

If both tonsils are done, a week or ten days should elapse between sittings or the tonsils may be done alternately, at intervals of about five days. I usually instruct the patient to return when all the white slough has disappeared. When this has occurred, you will be able to see exactly how much has been removed and where to commence your next operations.

When the tonsil looks very unhealthy or when the patient is suffering from the effects of toxic absorption from his tonsil, "rheumatic pains" for instance, it is wiser to fulgurate the surface of the tonsil at the first sitting rather than to coagulate it. Coagulation in such cases sometimes has the effect of stirring up the "rheumatic pains" or other general symptoms, while fulguration sterilizes the tonsil and kills its organisms.

To fulgurate the tonsil attach the active electrode to the Oudin terminal and set the machine so that it will give a thick six millimetre (quarter inch) spark. Hold the terminal close to the tonsil, but not touching it, depress the foot switch and spark over the entire surface of tonsil. The surface becomes charred. The dead tissue comes off in about a week and electro-coagulation may then be proceeded with in the usual way.

The usual number of sittings required for the removal of tonsils is about six, but the number depends on the amount requiring removal. The operation should be quite painless while it is being done and afterwards.

Pain during the coagulation process is due to:

- (i) Incomplete anaesthesia. The tonsils should be blanched if either of the anaesthetics which I have recommended, is used. If they are not blanched, further swabbing is indicated.
- (ii) The needle is inserted too deeply. If the needle is inserted too deeply, pain will be caused in those parts of the tonsil which the anaesthetic has not reached. The needle should not penetrate more than three millimetres (one-eighth of an inch) into the tonsil.
- (iii) Burning of the anterior or posterior pillar will cause quite a lot of pain. The operator should make sure that the needle is clear of the pillars and should gently retract the anterior pillar if it is in the way.

After-pain is due to:

- (i) Coagulation of too large an area. Coagulate in two or at most three places

only, as advised above. Aim at complete painlessness during the operation and the danger of after-pain will be minimized. (ii) Burning of the pillars. Guard against this as advised above. If discomfort should occur, it can be relieved by a suitable gargle. I also give powders containing:

Aspirin, 0·6 grammie (ten grains)
Phenacetin, 0·3 grammie (five grains)
Heroin, 0·005 grammie (one-twelfth of a grain)

One powder is given when necessary.

Haemorrhage should never occur and when it does, it is due to excess of zeal on the part of the operator. If the coagulation is carried to too great a depth, separation of the slough is attended with the risk of haemorrhage.

If the operator does not carry the coagulation to a greater depth than is rendered anaesthetic by a surface anaesthetic (and the patient will soon tell him if he has passed the limits), there will be no danger of haemorrhage.

Edema sometimes follows electro-coagulation and fulguration, especially when the upper part of the tonsil has been treated. It is not a troublesome sequel and does not last long. Gargling of the throat with warm saline solution usually relieves it.

The occurrence of edema can usually be lessened by paying attention to the setting of the machine, as I have explained above. Keep the time of coagulation down to one second, use a weak spark and a large indifferent electrode.

Removal of children's tonsils by electro-coagulation is not practicable for obvious reasons. They do not take kindly to intra-oral manipulations and would be terrified by the apparatus.

I do not use the method on adults of a very nervous temperament. The type of person to whom I refer is well known. Such people, although they admit that they feel no pain, become so apprehensive lest they might do so that each treatment would be an ordeal. Fortunately people of this type form only a small percentage of the population.

When the tonsil is very large, the patient should be told that its removal by electro-coagulation will take some time. It is better to explain this than to try and take away large portions of it at each sitting which could only result in pain and the possibility of haemorrhage.

Tonsils can be removed completely by electro-coagulation and I usually do this, but complete removal is not always necessary. The heat generated around the electrode is sufficient to kill micro-organisms and the crypts of the tonsil are completely destroyed, so that when a septic tonsil has been reduced to a small plaque of scarred tissue, I sometimes leave it at that and have never seen any ill effects from so doing. Other workers are of the same opinion.

In electro-coagulation I believe that we have a safe and efficient means of destroying tonsillar tissue, with results equal to those obtained by any other method. The procedure is simple and each treatment can be done in the consulting room and takes only about ten minutes.

I do not advance electro-coagulation as a substitute for dissection, but merely as a pleasant alternative, of which I should avail myself were my own tonsils in need of removal.

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- (2) M. A. Cohen: "Electro-Surgical Removal of Tonsils," *The Eye, Ear, Nose and Throat Monthly*, May, 1929.
- (3) Cumberbatch: "Diathermy."

A CLINICAL COMMENTARY ON ACHLORHYDRIA.¹

By ERIC SUSMAN, M.B., Ch.M. (Sydney), M.R.C.P. (London),

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Your most grave belly was deliberate,
Not rash like his accusers, and thus answer'd:
"True is it, my incorporate friends," quoth he,
"That I receive the general food at first,
Which you do live upon; and fit it is,
Because I am the store-house and the shop
Of the whole body . . ."

CORIOLANUS, Act I, Scene 1.

DURING the last few years the fractional test meal has become a fashionable and well-beloved investigation of physician and biochemist. The test is far too arbitrary and inexact to be deemed scientific. But, in spite of these obvious disabilities, we may accept the results on their present face value; and it is justifiable to conclude that the procedure has thrown much light on the more gross errors of gastric secretion.

For the present purpose achlorhydria may be defined as the persistent absence of free hydrochloric acid in the gastric juice. At the outset two fallacies should be recorded: (i) Psychical—the novelty and discomfort of the test may bring about an inhibition of secretion; prolongation of the original test, or a repetition, corrects this error; (ii) physical—chronic mucous gastritis may result in a pseudo-achlorhydria. If the test is repeated after a gastric lavage, the curve is frequently found to be within normal limits.

Frequency of Achlorhydria.

Table I gives some idea of the frequency of achlorhydria as met with in ordinary hospital practice. These figures include all test meals that were performed at the request of the physicians, indoor and outdoor, at the Royal Prince Alfred Hospital for a period of ten months.

TABLE I.

Group	Test Meals	Achlorhydria Reported	Percentage of Achlorhydria
Medical Departments (excluding Susman)	243	83	34
Susman's Out-Patient Department . . .	76	32	42

¹ Nine patients illustrative of this condition were shown at a meeting of the New South Wales Branch of the British Medical Association on May 8, 1930.

I isolate my own figures simply to show that the surprising figure of 34% may be increased to 42%, if (as has recently obtained at my own clinic) one is especially and deliberately watchful for the abnormality.

There are two kinds of achlorhydria.

Primary or Essential Achlorhydria.

Primary or essential achlorhydria is a constitutional, and apparently congenital, anomaly—a fundamental and inborn error of function. Izod Bennett has shown that this occurs in 4% of the healthy population. The Damoclean sword of Addisonian anaemia and of subacute combined degeneration of the spinal cord eternally hovers over the necks of the members of this symptomless, but nevertheless unfortunate, four *per centum*. This first variety of achlorhydria is, according to the view of Arthur Hurst, the essential pathogenetic factor in these two diseases. These people are perpetually vulnerable, living as they do on the physiological brink of a pathological abyss. As yet we are ignorant of the force or forces that push them over the precipice. Ungley and Suzman,⁽¹⁾ dealing with subacute combined degeneration, have suggested that these forces are in the nature of a deficiency disease in a susceptible (that is, an achlorhydriac) subject. This postulate receives some support of therapeutic (liver-feeding) and pathological analogies. From time to time one reads of cases of pernicious anaemia in which free hydrochloric acid was found in the gastric juice. But in spite of these freak and always questionable examples, we should remember that for all practical purposes the diagnosis of Addisonian anaemia without achlorhydria is quite untenable and never justifiable.

Secondary or Symptomatic Achlorhydria.

What follows is not a complete list of the causes of achlorhydria, but a consideration of some of the more common conditions under which we meet it in a general medical clinic.

Arthritis Deformans.

Every patient with osteoarthritis and rheumatoid arthritis should be investigated in order to discover the presence or absence of free hydrochloric acid in the stomach. There are two possible explanations of the occurrence of achlorhydria. The first is that the patient develops morbid changes in the joints, because he has no free acid in his stomach. The second is that the dyscrasia—the sum total of morbid events—is responsible both for the achlorhydria and the diseased processes of the joint tissues. The importance of achlorhydria, in my experience, lies in its prognostic significance. I find that patients with arthritis *plus* achlorhydria on vigorous and prolonged acid feeding do much better than those with sufficient of their own free acid. Of course nothing can cure the gross structural joint changes, but the exhibition of acid in the former group would appear definitely "to stop the rot."

Tertiary Syphilis.

It was the frequent occurrence of achlorhydria in cases of tertiary, late or "medical" syphilis that first drew my attention to the extraordinary frequency of achlorhydria in general. The patient does not necessarily complain of symptoms directly or remotely referable to the stomach. Indeed this is rather the exception. There is one interesting group of patients, of which I have seen several examples in the last two years. A stout female, in the sixth decade, comes under observation with general myxoedematous symptoms. The syndrome consists of an impalpable thyroid gland, a lowered basal metabolic rate (-20% to -30%), an irreproachable obstetrical history, a strongly positive Wassermann reaction and achlorhydria. On such evidence, it needs no great stretch of pathological imagination to postulate chronic syphilitic gastritis and chronic syphilitic thyroiditis, both atrophic in type. After prolonged antisyphilitic treatment free acid returns, but the thyroideal response is poor. So far there has been no opportunity of pathological confirmation or otherwise of this syphilitic syndrome.

Yet another highly interesting syphilitic condition is that of atrophic glossitis. The disease is essentially monosymptomatic—the patient complains of a sore tongue and no amount of questioning will make him give a symptom referable to a single other organ. On examination he is found to have a tongue that is clinically indistinguishable from the Hunterian glossitis of Addisonian anaemia, a normal blood picture, a reaction to the Wassermann test and achlorhydria. Acid feeding alone will abolish the symptom and acid feeding *plus* anti-syphilitic treatment brings about regeneration of the lingual papillæ and cures the disease. The differential diagnosis between chronic syphilitic glossitis and Hunterian glossitis is sometimes extremely difficult. The therapeutic response is of great diagnostic import. The constant association of achlorhydria with both conditions is profoundly significant and points to a common and mutual sympathy and sensitivity of stomach and tongue to various obnoxious processes.

Carcinoma Ventriculi.

Achlorhydria first saw the light of day in its close connexion with *carcinoma ventriculi*. Orthodox opinion favours the view that the absence of free hydrochloric acid is secondary to the presence of the cancer. Hurst,⁽²⁾ on the other hand, has recently made out a good case for achlorhydria being a frequent, but not constant, aetiological factor in the production of the disease, rather than the result of it. In this connexion Langdon Brown⁽³⁾ quotes a notable case. An apparently healthy woman requested a full investigation because her mother and daughter had both died of cancer of the stomach. Achlorhydria was the only pathological finding and this patient, too, eventually succumbed to the same malady.

Operations on Stomach and Duodenum.

Achlorhydria sometimes follows operations on the stomach and duodenum that are undertaken for the cure of peptic ulceration. Indeed, Bolton⁽⁴⁾ has recently stated that he regards permanent achlorhydria as the chief criterion of a surgical cure. This is perhaps an overstatement of the case. A great reduction of gastric acidity, without complete abolition, is surely the perfect result. More than once have I had good results by prescribing small doses of dilute hydrochloric acid in the treatment of mild dyspeptic symptoms in cases of achlorhydria following short-circuiting operations.

Neurasthenia.

There is a definite "neurasthenic" type of achlorhydria. I am thinking of the patient, usually a female, who commences the consultation with that unfelicitous remark: "I have a gastric stomach, Doctor." Such a person gives a vague, meandering history, is extremely long-winded, a zealous supporter of and an everlasting boon to the manufacturing chemist, and, almost from her intrauterine period, an exacting *connaisseuse* of doctors. With such a patient the poor physician is occasionally goaded on by the sheer energy of desperation to having a gastric analysis made. This mournful, melancholy group comprises a fair proportion of my series.

Miscellaneous.

Other well known clinical conditions in which achlorhydria is always a possible finding, include chronic appendicitis, chronic infection of the biliary passages, *acne rosacea*, *acne vulgaris*, chronic gastritis with *pyorrhæa alveolaris*. Professor Henry Moore⁽⁵⁾ has recently submitted the results of his investigations on the subject of achlorhydria to the Royal Academy of Medicine in Ireland. *Inter alia* he found that this anomaly occurred in 76% of patients suffering from Graves's disease and in 42% of those suffering from *diabetes mellitus*.

Symptomatology.

Is it possible to formulate a symptomatology for achlorhydria *qua* achlorhydria? I think not. At the same time a combination of two or three of the following symptoms occurred with sufficient frequency in my series as to be suggestive: (i) Vague, ill-defined, poorly localized abdominal discomfort, with no actual pain and without areas of localized tenderness; (ii) anorexia, especially for protein foods; (iii) recurrent attacks of diarrhoea with neither specific nor satisfactory bacteriological explanation; (iv) the sore tongue, noted above, but not necessarily in the extreme form of a frank atrophic glossitis.

Acknowledgement.

I wish to thank Dr. John Mande, my clinical assistant, who was responsible for the investigation of and observations upon many of the patients who form the subject matter of this communication.

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- ⁽³⁾ Langdon Brown: "Predestination in Disease," *The British Medical Journal*, March 22, 1930, page 525.
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A NOTE ON KOPLIK'S SPOTS.

By C. C. MCKELLAR, M.B., Ch.M.,
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A CONSIDERABLE experience of preeruptive diagnosis in measles and the realization of a widespread defective knowledge of the same lead me to offer a few notes which may be of use.

In the first place Koplik's spots are no myth, as many seem to imagine, as they occur in practically every case of measles and the diagnosis established upon them is absolute. By that I mean that we take such a child, perhaps with no coryza and looking perfectly well and put him in a ward with patients suffering from florid measles—that is the real test of faith, that is where many fail who profess to know Koplik's spots and their significance. Such a diagnosis may be established on the average forty-eight hours before the first sign of a rash, frequently it is three and not seldom four complete days, perhaps even five.

This is of particular value in preventing hospital epidemics, so that when one receives a case: "Acute bronchitis, temperature 101°, please admit," one look at the mouth may suffice to say: "The child cannot be admitted; it has measles and will develop a rash in a day or two." Or again, in the wards a patient with scarlet fever had a persistent raised temperature, the mouth showed Koplik's spots and the patient was removed from the ward; two days later a measles rash appeared, but no further cases developed in the ward.

Again, Koplik's spots are useful in separating early measles from rubella, a common problem, for the patient in the former is not necessarily very ill, while in rubella the temperature may be high, and often enlarged cervical glands in children are due to other causes. Also note their absence in toxic erythema, too often labelled measles.

As regards identification of the lesion the usual general text book description is of little use and also gives the impression of one stage rather than a continually changing picture. The mouth should be examined in a brilliant light (poor or moderate illumination is useless). A Koplik's spot is seen as a minute white (not bluish) ulcer just big enough to be distinguished as such by the naked eye and sur-

rounded by a small inflammatory areola; actually it is a broken down or eroded papule and often the pre-Koplik condition can be identified, though rarely can an absolute diagnosis be established at this stage. Now one such spot or ulcer is suspicious, but risky to rely on, and usually one finds a cluster, perhaps three or four or a dozen, commonly near the lower molars, but may be anywhere at all on the buccal mucosa. These multiply and spread over the entire buccal mucosa so that at the next visit they may be in hundreds and later with the coalescence of the areolæ the mouth presents the picture of an acute stomatitis, close inspection revealing myriads of Koplik's spots. Next the spots are gone, but many white flecks and tops on the resolving mucosa are still diagnostic, then a general velvetyness, almost diagnostic, and finally in a normal case the mucosa is rapidly restored to a smooth, healthy condition.

The rash may appear at any stage during this transition; it may come simultaneously with the first spots or not till after their disappearance, but at the time of earliest rash, that is, blush behind ears or a few spots on body, the mouth is still usually diagnostic, though healing so rapidly that with a well developed rash I think I have seen the spots in less than 50% of cases.

Let me repeat: these spots and certain stages of the ensuing stomatitis are infallibly diagnostic. Ordinary stomatitis, casual ulcers, food particles, thrush exist, but they are not fallacies, they never deceive. Every patient with Koplik's spots is suffering from measles and I doubt if I have seen a patient with measles, under observation before the rash, without Koplik's spots.

Reports of Cases.

A CURIOUS ACCIDENT.

By C. CRAIG, M.D., M.S. (Melbourne), F.C.S.A.,
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J.C.C., aged eighteen years, when admitted, stated that some hours previously he had been "fooling" with some friends and a long thin-bladed knife had penetrated his abdomen. He had bled a good deal from the wound, had felt some pain at the time and had vomited several times. He now felt much better.

On examination the patient was a little pale, but otherwise in good condition. There was a stab wound 1·25 centimetres (half an inch) long, 5·0 centimetres (two inches) below the left costal margin and 7·5 centimetres (three inches) from the mid-line. There was some suggestion of fullness under the left costal margin, but no rigidity or tenderness. The patient's condition was so good that it was decided to do nothing.

Twenty-four hours later the patient became paler and the pulse rate began to rise. On examination there was now definite fullness in the left upper abdomen and there was a large area of dulness to percussion. No definite mass could be felt.

An oblique incision was made over the dull area. A membrane was opened and it was found that there had been a large haemorrhage into a huge hydronephrotic sac. The blood was evacuated and a small stab wound was seen in the anterior wall of the sac which was not bleeding.

As the patient's condition was not good, nephrostomy was performed and the incision closed. The patient's condition improved in a few days. A urea concentration test was then done, separate samples being collected from the bladder and from the nephrostomy wound. Two hours after urea had been given the results were as follows: Urine from bladder, 3·25%; urine from wound, 1·5%. The blood urea was forty milligrammes per centum.

In about three weeks the nephrostomy wound closed. The patient soon left hospital.

Four months later he returned to have the kidney removed. This was done through an oblique lumbar incision without special difficulty. The sac was found to be the size of a small football. There was a stricture at the junction of the pelvis and ureter. The ureter was not dilated. His convalescence was normal. Some weeks later renal function tests were again done and were found to be normal.

Comment.

The case is reported because of its unusual nature. An interesting point crops up, however, in regard to the course of action taken when the patient was first admitted. The policy followed was to wait until symptoms arose. On consideration I have decided that this was the wrong policy and that in all cases of penetrating wounds of the abdomen immediate exploration should be performed.

Reviews.

A BOOK ON HYGIENE FOR NURSES.

ADVANCES in hygiene have placed this subject in the forefront of medical sciences. Enough is known about mental and physical health to raise the general standard of well-being if the knowledge could be put into practice. This can only be achieved through education, commencing with professions most directly concerned, so that the maintenance of health becomes an important part of their practice instead of being too often the happy hunting ground of ignorant enthusiasts and quacks. A welcome appreciation of this fact is the appearance of a hand book on hygiene for nurses.¹

In their preface the authors state: "It appears to us that too much stress has hitherto been laid on the communal aspect of hygiene, namely sewerage systems, water supplies, etc. In an endeavour to rectify this, we have . . . concentrated on what we call the personal aspect." Perusal of their book, however, only partially justifies this statement. The first half deals clearly and accurately with the following subjects: Water, air and ventilation, the house, heating, lighting, sewage disposal and external parasites. Being largely matters of public health for which the nurse is seldom responsible, they might with advantage have been condensed in appendices. Moreover, the instruction of students to be effective should not only be accurate, but stimulating.

Part II, dealing with personal hygiene, is the more important. "The health of the community," as the authors state, "depends on the health of the individual." The principles of personal health discussed are: Cleanliness, clothing, exercise, rest, recreation, habits, diet and parasites. Perhaps as the book emanates from Edinburgh, no mention is made of sunlight and insolation. It is pleasing to see mental hygiene referred to, even inadequately. The relative importance of mental factors demand at least a special chapter in any book dealing with the maintenance of health.

In elaborating these principles, articles follow on the hygiene of the pregnant woman, of babyhood, the school child, and on persons after forty years of age. Considering the difficulty of condensation, they are in the main

¹ "Hygiene for Nurses," by John Guy, M.D., D.P.H., F.R.F.P.S., F.R.C.P., and G. J. I. Linklater, O.B.E., M.D., D.P.H., D.T.M.&H., M.R.C.P.; 1930. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 218. Price: 5s. net.

adequate, though a few minor points may be queried. Supplementary feeding is advocated on page 131, during the establishment of breast feeding. Complementary feedings only should be given. Artificial feeding with whole cow's milk is highly dangerous in Australia where the fat percentage is higher than in Scotland. Some mention of the health problems of the pre-school child might have been included.

The concluding chapters give an admirable account of diet and metabolism. Recent work on nutrition and vitamins is included and special reference is made to vegetables, meat foods and milk. The increasing part taken by the nursing profession in relation to health is also mentioned.

Considered as a whole, Part II constitutes a valuable addition to the literature on personal hygiene.

PAEDIATRICS FOR NURSES.

"A TEXT-BOOK ON THE NURSING AND DISEASES OF SICK CHILDREN," edited by Dr. Alan Moncrieff on behalf of himself and three of his colleagues and the Sister Tutor at the Hospital for Sick Children, Great Ormond Street, London, is intended for use by nursing trainees, nurses and welfare workers.¹

As so frequently happens with a first edition, there are many details which require emendation. The sections on bedsores and on the feeding of the sick child should not appear in the chapter on the normal child. Nurses should be warned of the danger and extravagance of the nitric acid test for albumin in the urine and of the fallacies of the Fehling test. The direct connexion of a nasal catheter to an oxygen cylinder and the arrangement of the half steam tent as depicted are not free from danger to the patient. The failure to mention the temperature at which to maintain premature babies and the omission of the thermometer from the crib are oversights, but there are several misstatements which should be corrected. Still-born babies cannot live for a day or two. The normal baby should sit up long before he is twelve months old. If a baby's diet consists of one-tenth of the body weight in whole milk, it is necessary to supplement with water to satisfy the fluid requirement. Minute quantities of vitamins are not now regarded as sufficient.

Insufficient space has been allotted to the consideration of problems of infancy for welfare workers and the study of dietetics will not satisfy the modern nurse. The authors have not fallen far short of their ambitious attempt to make the work a complete one and though at first it seems disappointing as a text book for nurses, later, when one realizes what a wealth of nursing knowledge is woven into the descriptions of diseases of children, the sense of disappointment disappears.

The practicable information that it contains concerning the routine procedures at the famous Hospital for Sick Children is by itself enough to make the book valued by medical students and practitioners.

NEUROLOGICAL EXAMINATION.

For those who do not know Dr. Monrad-Krohn's manual, we may say that its design is to give an account of the clinical methods necessary to a complete neurological and psychiatric examination.² In this it succeeds because the description is thoroughly comprehensive and, more than this, so far as we can discover, it is in no way wanting in accuracy. But it must be understood that the book is not one on diagnosis, it deals wholly or almost wholly

¹ "A Textbook on the Nursing and Diseases of Sick Children for Nurses and Welfare Workers," by Various Authors. Edited by Alan Moncrieff, M.D., B.S., M.R.C.P., 1930. London: H. K. Lewis and Company Limited. Demy 8vo., pp. 596, with 111 illustrations. Price: 15s. net.

² "The Clinical Examination of the Nervous System," by G. H. Monrad-Krohn, M.D., F.R.C.P., Fifth Edition; 1930. London: H. K. Lewis and Company Limited. Crown 8vo., pp. 238, with illustrations. Price: 7s. 6d. net.

with technique, it is a compendium of methods, remarks on diagnosis where introduced are to illustrate the meaning of given tests.

Every practitioner knows and every student is being taught that in the approach to diagnosis examination must precede speculation. In the case of the nervous system, perhaps more than any other, so-called "spot diagnosis" is a useless experiment and it is equally futile to begin by probing or sounding one's text book memory as to the type of affection to which the patient best conforms.

First published in 1921, the book has run through five editions, which is perhaps its highest recommendation. Each edition has been subjected to revision and the present issue is brought up to date by the inclusion of an account of the ways of performing encephalography and ventriculography, and of the use of hypertonic saline solutions as a means to reduce intracranial tension and thereby render a patient whose thought processes are confused by a cerebral tumour or injury, more cooperative for examination.

Notes on Books, Current Journals and New Appliances.

THE JOURNAL OF THE COLLEGE OF SURGEONS OF AUSTRALASIA.

The issue of *The Journal of the College of Surgeons of Australasia* for July, 1930, is to hand. This is the first number of the third volume. It contains nine original articles and there are six contributions under the caption "Case Reports and Notes on Technique."

R. B. Wade contributes an article on congenitally dilated colon or Hirschsprung's disease. He describes results obtained by himself and also discusses the innervation of the alimentary canal and the physiology of the autonomous nervous system. After ramisection the constipation is "relieved and relieved absolutely." Habits of regularity must be maintained after the operation. J. C. Hemsley writes on right-sided visceroptosis. This condition is due to the persistence of the embryonic mesentery of the ascending colon. The degree of ptosis depends on the shape of the patient's abdomen, the length of the mesentery and the presence of abnormal bands and membranes. Dr. Hemsley reports the results obtained by him in sixty-four cases; he used Waugh's colopexy operation. R. Hamilton Russell writes on "Some Fractures and Some Principles"; this is an article that may be read with profit by any practitioner treating fractures, whether he belong to the Hamilton Russell school of thought or not. C. Jeff Miller, of New Orleans, United States of America, discusses in an exhaustive fashion 239 deaths from acute appendicitis. Reference will be made to this important study at a later date. Professor F. Wood Jones deals with some physical and biological concepts in science. H. R. G. Poate gives an account of results obtained by him in twenty-nine operations of sympathetic ramisection—a clear and dispassionate summary. Makoto Saito, of Japan, describes the X ray diagnosis of cerebral tumours. Robert Fowler contributes a long and well illustrated account of gynaecological electro-surgery with high frequency currents. H. O. Barnes, of San Francisco, describes the surgical treatment of some forms of lipomatosis. T. E. Lambert describes surgical operation for hernia in which division of the deep epigastric artery and vein is carried out; some useful illustrations are included in this article. Roy Felstead describes an operation carried out by him by the Schubert technique for the formation of an artificial vagina. Errors in development of the peritoneum and foramen of Winslow are dealt with by E. Hughes-Jones and E. S. J. King discusses the surgical importance of inflammation in fat tissue. A. Eisdell Moore and Douglas Robb report a case of acute tuberculosis of the breast and Douglas Robb reports one of phlegmonous gastritis. In the account of the annual meeting of the College are published the speech of Sir Henry Newland in presenting to R. Hamilton Russell his portrait in oils, and the latter's reply. There is also a charming reproduction in sepia of the portrait.

The Medical Journal of Australia

SATURDAY, AUGUST 23, 1930.

All articles submitted for publication in this journal should be typed with double or triple spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

SYPHILIS AND THE WASSERMANN TEST.

ALTHOUGH most medical practitioners would agree that success is dependent on the treatment of the patient and not of the disease, this fundamental principle is often forgotten. In syphilis it is apt to be overlooked more than in any other condition. The routine use of so many injections of an arsenical preparation or of bismuth with the administration of mercury and iodide of potash for periods of varying length is often adopted. The Wassermann test, it is true, may be used as a control and this routine is sometimes adequate. It cannot be too strongly emphasized, however, that the treatment of a syphilitic patient should be planned according to the stage of the disease when advice is first sought, according to the virulence of the infection and to some extent according to the patient's occupation. The treatment of a patient who seeks advice as soon as the primary sore appears, need be neither so intense nor of such long duration as that of a patient who presents himself for treatment when secondary manifestations have been established for some time. Further, the patient who manifests involvement of the central nervous system before or during treatment, must realize that he will have to be under observation at suitable intervals during many years, if not for the rest of his life.

Even though the facts enumerated be appreciated and borne in mind and though the matter seems perfectly simple, in practice it is not so simple—and for several reasons. In the first place, as shown by C. B. Norris, to whose work reference was recently made in this journal, some persons may be unaware of infection. This seems extraordinary and difficult to believe, but apparently it is a fact. Some explanation is offered by the occasional concurrence of a febrile illness such as pneumonia or enteric fever or even malaria with the syphilitic infection. Since fever therapy is used to destroy the *Spirocheta pallida* in general paralysis of the insane, it is clear that fever occurring in the early stages of syphilis, would modify the clinical picture and would increase the patient's resistance and create a relative immunity. In these circumstances the patient might receive no treatment and the identity of subsequent syphilitic lesions might not be obvious. Here would be a possible reason for failure to obtain a response to the Wassermann test in an undoubted syphilitic infection. This leads to reiteration of the truism that failure to react to the Wassermann test does not necessarily mean absence of infection. Another difficulty in regard to adequate treatment is that of persuading the patient of the necessity for continuing treatment or for remaining under observation at its conclusion. The non-occurrence of rupial and other severe stigmata of syphilis consequent on early treatment by arsenical preparations has the effect of minimizing the seriousness of the infection in the eyes of the patient and he is apt to regard the conscientious practitioner as an alarmist. Of course, the fault does not always lie with the patient. The important point emerging from all these considerations and standing in bold relief is that most, if not all, of the late syphilitic tragedies arise from inadequate treatment.

There can be no real cure for tragedies; their cure lies in their prevention. The most logical course at this point would be to enter into a discussion on what constitutes adequate treatment and to lay down a standard of clinical cure. This must be reserved for another occasion. The present intention is to draw attention to the lesser calamities arising from inadequate treatment, calamities the

true nature of which is often masked. Syphilis can colour any clinical picture. The literature abounds with accounts of gastric ulcers, of nasal and ophthalmic lesions, of cancer-like growths and of other such which have resisted treatment until every diagnostic possibility other than syphilis was exhausted or until a chance Wassermann test yielded a positive result. The *Spirochæta pallida* is no respecter of person or rank; it is equally at home in the tissues of an archbishop or a ship's carpenter, of a duchess or a scullery maid; and worshippers at the shrine of Venus outnumber those of all other shrines put together. The Wassermann test is the key to the situation. For practical purposes the result of the test may be accepted as indicating the presence or absence of syphilis in the types of condition mentioned. Not only must the possibility of the presence of the *Spirochæta pallida* be kept in mind, but the Wassermann test should be used whenever the true nature of a clinical condition is not clear. Its possible application to the cerebro-spinal fluid must be remembered. If the cause of the lesser calamities be recognized, some of the syphilitic tragedies will be prevented.

Current Comment.

OSTEOMALACIA.

THE aetiology of diseases of nutrition and metabolism generally remains obscure. Many ingenious theories have been proposed, but to the exacting critic none has appeared entirely satisfactory. The more that is learned concerning human metabolism, the greater is its apparent complexity. The parts played by the endocrine glands are as yet but dimly guessed at; their interdependence and their antagonisms and, under many circumstances, their seemingly paradoxical behaviour, present a problem which is baffling in the extreme. Even the deficiency diseases which have been so long considered by the vast majority of medical men to be due to insufficiency of this vitamin or that, can no more be regarded with such complacency; the possibility of infection has been not irrationally suggested.

Osteomalacia has had from time to time various causes assigned to it—calcium deficiency, vitamin deficiency, lack of sunlight, endocrine disturbance *et cetera*. Hutchison and Patel reported on the comparative frequency of the disease among Mohammedan women as against its rarity among Hindus in Bombay, and attributed this to the Mohammedan purdah system, which results in a lack of fresh air and exercise; they did not regard

diet deficiency as a possible cause. Dalyell and Chick believed the outbreak of so-called hunger osteomalacia in Vienna at the end of the Great War to have been due to diet deficiency; they noted an unusual prevalence of rickets at the same time. Acting on the assumption that osteomalacia was due to vasodilation, Bossi treated the condition by the administration of adrenalin with satisfactory results. Ovarian hyperplasia is a feature of the disease and oophorectomy has been practised as a therapeutic procedure with some success. Blair Bell pointed out that the ovaries are concerned in calcium katabolism and that their activity is controlled to some extent by the adrenals and the pituitary. He advised the administration of infundibular extract in the treatment of osteomalacia. Erdheim observed hyperplasia of the parathyroids. Blair Bell suggested that this would probably be in antagonism to the excessive activity of the ovaries. Women are far more susceptible to the disease than are men, and three-quarters of all cases commence during pregnancy.

Though osteomalacia is an uncommon disease, a careful study on modern lines of the disturbance of metabolism associated with it should prove of value. Such a study has been made by Samuel L. Gargill, Dorothy Rourke Gilligan and Herrman L. Blumgart.¹ In a recent communication they review the literature and report a case of the disease. They express the opinion that there are several forms of osteomalacia and that its cause, clinical manifestations and incidence vary greatly in different parts of the world.

Their patient was a white woman, aged thirty-eight years. She had given birth to her first child at the age of fourteen years and had borne six children thereafter. The youngest child had symptoms suggestive of rickets. The patient herself believed her illness had commenced after the birth of this child, two and a half years prior to her admission to hospital, but she admitted that she had suffered from generalized pains and aches during her last pregnancy, especially during the later months. Her back had become humped and her stature shorter some six months before she came under observation. She had contracted syphilis twelve years before and had received intensive treatment. Her blood did not react to Kahn or Wassermann tests after her admission to hospital. Her menses had commenced at the age of eight years. Clinical and radiological examination left no doubt as to the diagnosis of osteomalacia.

The patient's calcium and phosphorus metabolism was very carefully investigated under rigidly controlled conditions. It was found that when she was taking a diet low in vitamins and calcium and phosphorus, her excretion of calcium amounted to 45 milligrammes per kilogram of body weight as against 6·7 milligrammes per kilogram in the normal individual. An intake of calcium considerably in excess of that required for normal metabolism effected no appreciable change in the calcium

balance. The further addition to the diet of 50 cubic centimetres of cod liver oil daily had no appreciable effect on the storage of calcium and phosphorus. When, in addition to this, cod liver oil in tablet form consisting of the vitamin A equivalent of 180 cubic centimetres and the vitamin D equivalent of 38 cubic centimetres of fresh oil was administered daily, for the first time the patient was able to utilize appreciable quantities of calcium and phosphorus. When ultra-violet irradiation was instituted as an additional therapeutic procedure, increased storage of calcium and phosphorus was accompanied by a distinct clinical improvement. The additional administration of 1.24 grammes of calcium lactate daily increased phosphorus storage as well as calcium storage, and the administration of 1.24 grammes of sodium phosphate daily similarly influenced calcium storage. When calcium lactate and sodium phosphate were administered together, storage of both calcium and phosphorus increased to a greater extent than when either drug was administered singly. Finally, when part of the calcium lactate and sodium phosphate was replaced by foods rich in natural calcium and phosphorus, the storage of these two elements was no further increased.

As a result of treatment the density of the bone as observed radiologically increased, the patient became stronger and heavier and actually increased in height. The quantity of calcium in the blood serum even before the commencement of treatment was not below normal, whereas the phosphorus content was low and remained low despite treatment. This fact is interpreted by Gargill, Gilligan and Blumgart as an indication that the fundamental metabolic fault has not been altered. They are unable to point to any definite diet deficiency or endocrine abnormality as a possible cause of osteomalacia in their patient; on the contrary, the woman had taken 30 cubic centimetres of cod liver oil on alternate days for a period of six months prior to admission to hospital. They believe that osteomalacia as manifested by their patient is a form of adult rickets, basing their opinion on the similarity between the two conditions as observed by a study of the Röntgenological and clinical appearances, the disturbance of metabolism and the response to suitable treatment.

A disease similar to osteomalacia observed in domestic animals has been attributed to lack of calcium in the diet; it is obvious from a study of the metabolism that this cannot be considered a possible cause of the disease as it affects mankind.

There can be no doubt but that in osteomalacia there is a very considerable disturbance of the endocrine system, but it scarcely seems rational to lay the blame on any one particular gland; logical conclusions may be drawn only by a study of the endocrine system as a whole. Probably interference with the function of these glands, some of which are definitely known to be concerned in calcium metabolism, is the ultimate cause of the disease. It would appear that as in rickets, deficiency

in vitamin D plays a part, and it might well be argued that this is the primary factor, to which the endocrine disturbance is secondary. Vitamin deficiency leads to increased liability to infection and the possibility of the existence of an infective agency should not be overlooked.

TRANSIENT BUNDLE BRANCH BLOCK.

THE diagnosis of bundle branch block is possible only by means of electrocardiography. As it is significant of myocardial disease, its recognition may be regarded as of some importance. Of itself it gives rise to no symptoms, but patients in whom it may be observed, frequently present obvious symptoms of other cardiac disease.

It cannot be said that the relief of bundle branch block *per se* is of any great importance, but observation of the effect on it of various therapeutic agencies might conceivably help to shed some light on arrhythmia and cardiac disease generally.

In a recent communication Benjamin M. Baker, Junior, reports a case and discusses the condition and a means of relieving it.¹ His patient was an old man who was suffering from auricular fibrillation and whose systolic blood pressure was 235 and diastolic 110 millimetres of mercury. Electrocardiography revealed the presence of right bundle branch block. Rest and the administration of digitalis relieved the fibrillation and at the same time the intraventricular conduction became apparently normal. Delay in conduction, however, could still be induced by exercise with consequent acceleration in the heart rate. Baker administered oxygen to his patient over a period of five minutes and found that exercise immediately afterwards did not result in bundle branch block, although it caused an acceleration of the pulse rate to a point at which the block formerly occurred. Baker concludes that bundle branch block may occur as a transient phenomenon and that in such an event permanent interruption in the continuity of the bundle need not be assumed. He suggests that the condition may be due to functional inefficiency in conduction and only becomes apparent when the myocardium is under stress, as, for example, when for some reason there is a demand for more rapid cardiac action.

That asphyxia may affect intraventricular conductivity has been noted by several authors, and Mackenzie remarked on the value of oxygen in the treatment of complete heart block during the period of unconsciousness. Baker's patient presented evidence of cardiac failure, and possibly under strain his circulation was not adequate for the proper supply of oxygenated blood to an inefficient right bundle branch. The administration of oxygen made good the deficiency. Observations should be made on persons with a similar defect in conduction of the contraction impulse but who have no obvious heart failure. The effects of the administration of oxygen to such persons might prove of interest and value.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

Effects of Ethyl Alcohol on Growth of Chicks.

W. E. ELHARDT (*American Journal of Physiology*, March, 1930) has studied the effect of ethyl alcohol of different concentrations on the growth of chicks. The chicks given heavy doses of alcohol were more irritable and excitable than the other groups; they appeared less alert and the colour of their combs and feathers was not so bright. The group receiving light doses of alcohol had on the whole larger, fuller, redder combs and brighter, more compact feathers than either of the other groups. As to growth, throughout the experiment the birds receiving light doses of alcohol led all the others; the controls came second, while those receiving heavy doses of alcohol were invariably behind. Even the females of the light alcohol line outgrew the male controls up to the age of eight weeks.

Synergism Between Oestrin and Oxytocin.

A. S. PARKES (*Journal of Physiology*, June, 1930) has investigated the effects of "Pitultrin" and oxytocin on the pregnant uterus of the mouse. The former preparation caused the abortion of dead foetuses one or two days after injection in doses of one unit or more. Except in isolated instances oxytocin was apparently without effect, even in doses of five units. The pressor substance of the posterior lobe of the pituitary gland, vasopressin, caused abortion in six of eight laboratory animals. Since the evacuation of the uterus occurred one to three days after the administration of the drug, the effect is probably due to a vascular disturbance of the placenta which causes foetal death. Single injections of oestrin, varying from one to 300 units, produced abortion in only one case out of 47. The effects of multiple injections of this preparation are known to be greater than those of a single equivalent dose, but even 260 units in thirteen hourly injections did not cause even delayed abortion regularly. A similar series of injections of oestrin followed immediately by one unit of oxytocin was found to cause evacuation of the uterus within one to six hours. It is suggested that parturition is at least assisted by the uterus attaining a sensitivity to oxytocin which is absent during the earlier stages of pregnancy.

Inensible Perspiration.

RESEARCHES by A. JORES (*Zeitschrift für die gesamte experimentelle Medizin*, April, 1930) confirm the parallelism between inensible perspiration and metabolic rate, previously noticed by Benedict. The basal metabolic rates of a number of subjects, normal and otherwise, deter-

mined directly, agreed within 5% with the rates predicted from the measured insensible perspiration, by the application of Benedict's table. Rubner estimated the amount of water lost through the human skin without visible sweating to be 500 grammes per square metre of surface in twenty-four hours. Jores finds this value to be only 200 grammes under basal conditions. If the activity of the sweat glands is suppressed by atropine, this relationship between water loss and metabolism persists even after exercise. During nocturnal sleep insensible perspiration increases. In the day time this increase does not occur. Since it is most marked during the early hours of sleep and then shows a steady decline, it is suggested that there exists a parallelism between depth of sleep and rate of water transpiration.

The Fatal Effect of Total Loss of Gastric Juice.

It is known that complete pyloric obstruction in laboratory animals causes death within three or four days. There is a profound fall in blood chloride, a simultaneous increase in carbon dioxide capacity and later a rise in urea and non-protein nitrogen. It has been suggested that death may be due to a toxæmia which causes a withdrawal of chloride from the blood, or, on the other hand, to the failure of resorption of water and salts excreted in the gastric juice. L. R. Dragstedt and J. C. Ellis (*American Journal of Physiology*, June, 1930) have investigated the effects of complete loss of gastric juice through a pyloric fistula. Together with the gastrostomy an oesophago-duodenal anastomosis was performed. Though small quantities of food were taken, the animals died in five to eight days. There was a progressive decrease in the concentration of blood chloride from the normal of 300 milligrammes of chloride per 100 cubic centimetres to 108 milligrammes. The carbon dioxide combining power increased from the normal 45 to 140 volumes per centum and the pH value rose from 7.30 to 7.75. There was a terminal rise of non-protein nitrogen from 27 to 180 milligrammes and of urea nitrogen from 12 to 154 milligrammes per 100 cubic centimetres. No decrease in blood volume nor increased concentration of the blood has been observed. The loss of body weight which may amount to as much as a kilogram in twenty-four hours, must therefore be largely due to removal of water from the tissues. The changes in non-protein and urea nitrogen accompany urinary suppression. This oliguria is probably the result of tissue dehydration and the fall in blood chloride. In spite of the alkalosis no symptoms of tetany or muscular irritability were observed. The symptoms could be relieved and life prolonged to 76 days by the daily intravenous injection of 2,000 to 3,000 cubic centimetres of Ringer's solution. This also lessened the changes in the blood. It was noticed that after the

Ringer injections the animals showed marked thirst. This would suggest that thirst is related not so much to dehydration as to a disturbance in the water-salt balance of the body. The isolated stomach with its blood and vagal supply intact may secrete from 1,000 to 2,600 cubic centimetres of normal gastric juice and this in spite of the fact that the only stimuli to secretion are extragastric. Even when the blood chloride has fallen to less than one-third of its normal value and an extreme degree of alkalois exists, a gastric juice with a free hydrochloric acid value of 0.31% and a total chloride content of 0.45% may be secreted. With marked chemical changes in the plasma the rate of secretion is diminished. Nevertheless the gastric glands are capable of removing sufficient chloride from the tissues and of decreasing the acidity of the tissue fluids to such a degree that death results. Clinical application of these findings has been made. A number of patients with high intestinal and pyloric obstruction, paralytic ileus, persistent vomiting and others in which the constituents of the gastric juice could not be reabsorbed, have been successfully treated by intravenous administration of physiological saline solution.

Effects of Warm Immersion Baths upon the Circulation.

H. WHITRIDGE DAVIES and G. HOLMES (*Quarterly Journal of Medicine*, April, 1930) have studied the circulatory effects in human subjects consequent upon immersion in baths varying in temperature from 37° to 40° C. Immediately on entering the bath an increase in pulse rate occurs. This rise precedes any rise in body temperature and may be due to a cutaneous reflex or to some hydrostatic effect. There is a further delayed rise accompanying an increase in body temperature. This is most probably the result of increased temperature of the sino-auricular node. Systolic blood pressure increases with pulse rate and body temperature. The extent of this change may be as much as 25 millimetres. Diastolic pressure is difficult to estimate, owing to marked changes in the Korotkow sounds. During the third phase the sounds become first louder and then gradually softer, passing imperceptibly into the fourth phase. At times the sounds are audible down to zero pressure. In spite of these changes it is obvious that diastolic pressure is considerably reduced. Under these conditions there is not necessarily an association between pulse rate, pulse pressure and general circulation rate. In some cases circulation rate was increased, but never by much more than 50%. Associated with pulmonary hyperventilation and considerable reduction in alveolar carbon dioxide pressure there occurred in two cases a diminished circulation rate. The increased pulse pressure is accompanied by a diminished stroke volume. This is contrary to the usual relationship between these two values.

It is suggested that these effects are the result of arterial and arteriolar constriction accompanied by capillary dilatation. Apart from the temperature effect on the sino-auricular node, the condition appears to resemble a slight degree of histamine shock.

BIOLOGICAL CHEMISTRY.

The Sugar Excretion of Dogs Deprived of the Pancreas.

SAMUEL SOSKIN (*Biochemical Journal*, Volume XXIII, Number 6, page 1384) has performed some experiments which lend further support to Macleod's evidence for the conversion of fat into carbohydrate in the animal organism. He discusses the views of the European school which has long advocated the overproduction theory of diabetes. According to this theory the glycosuria and hyperglycæmia of diabetes are due not to a defect in oxidation of carbohydrates, but rather to an overproduction of glucose from protein and fat; this causes its accumulation in spite of a continual power of oxidation. In this series of experiments the author used three dogs totally deprived of the pancreas and maintained in an excellent state of health and nutrition by the use of "Insulin." Throughout the experiments the sugar, nitrogen and total ketone excretion was determined for twenty-four hour periods and on the day of the fat administration the animal's respiratory quotient was determined in a carefully controlled respiratory cabinet of the Benedict type. The administration of fat was followed by an excretion of extra glucose which could not be accounted for by the glycerol portion of the fat, the nitrogen excretion and the carbohydrate store of the animal. Gluconeogenesis from fatty acid was therefore confirmed. The author emphasizes the physiological limitations of this type of experiment, as in those with clearly positive results the animal died in every instance, despite all efforts to revive it. In one of these experiments in which inarvin was the fat administered, it failed to show its supposed antiketogenic action.

Ergosterol Poisoning.

MARCEL HAENDEL AND JUAN MALET (*Virchow's Archiv für pathologische Anatomie und Physiologie und für klinische Medizin*, February 17, 1930) discuss ergosterol poisoning. By the administration of irradiated ergosterol it is possible to produce in rabbits and guinea-pigs a cachexia characterized by an increase in the blood serum cholesterol and by a fat lipid infiltration of the liver, spleen, kidneys, adrenal bodies, aorta, heart muscle and testicles. When irradiated ergosterol is inactivated by heat, the action is less pronounced. The authors state that there are three possible explanations of the action of irradiated ergosterol. The first is that it is due to a hypervitaminosis, the second

is that ultra-violet radiation gives rise to poisonous substances, and the third is that it is due to the action of stearin. The second possibility is regarded as quite unfounded and not worthy of consideration. Irradiated ergosterol acts quicker and in smaller quantity than cholesterol. Kreftmair and Moll have described a poisonous effect of non-irradiated ergosterol and the authors have described a similar effect with inactivated ergosterol. Ergosterol has an action similar to that of cholesterol and its action can be increased by radiation: ergosterol becomes a vitamin. The authors ask whether it is not a false conclusion to believe that the change into vitamin is responsible for the increase in the poisonous properties. They think that it is probable that cholesterin, ergosterol and irradiated ergosterol have the same poisonous effect and that they differ from one another in strength merely according to their different stearins. In the course of their discussion the authors state that if hypervitaminosis were responsible, it would be expected that the poisonous effect would be less if food poor in vitamin were used. It has been shown that this is not so. The conclusion is reached that the hypervitaminosis hypothesis is completely unproven. The authors give details of their own experimental observations and conclude that in ergosterol poisoning there occur multiple disturbances of the lipid metabolism which are evidenced by organ infiltration and hypercholesterolemia. Ergosterol poisoning may be looked on as a "stearin effect" and it may be regarded in its essential characteristics as identical with cholesterol poisoning.

Vitamin A and Carotene.

THE vitamin A activity of red palm oil carotene has been investigated by Thomas Moore (*Biochemical Journal*, Volume XXIII, Number 6, page 1265). In a previous communication this author confirmed the claim of Euler, Euler and Hellstrom that the pigment carotene in a state of apparent purity possessed intense vitamin A activity and indicated the possibility that carotene might behave *in vivo* as a precursor of the vitamin. It was therefore of interest to test the activity of carotene derived from as many sources as possible and the present communication deals with the activity of a sample of the pigment prepared from red palm oil. Difficulty was met with in separating the pigment from fat. Biological tests of both the crude, unsaponified fraction and the isolated pigment were carried out, the technique described in the author's previous paper being used. The growth curves obtained showed that 0.01 milligramme of the crystalline pigment sufficed to restore slow growth in two rats, whereas the minimal dose of the concentrate lay at a higher level, 0.02 milligramme giving no response and 0.2 milligramme sufficing for irregular growth. This concentration of activity in the crystalline portion confirms the

finding that carotene derived from carrots is of much greater activity than the fat from which it has been separated. Moore has also investigated the absence of vitamin D from carotene. Young albino rats were placed upon a rachitogenic diet and graded doses of carotene were administered daily from the beginning of the experiment. After thirty-five days the rats were killed and the rib junctions examined. It was found that the carotene did not prevent the development of rickets when administered at a level equivalent to about one hundred times the minimal dose for vitamin A. As it had been suggested that the cause of the divergent results of other workers upon the activity of carotene might lie in some unsuspected difference in biological technique rather than in the degree of purity of the samples examined and that the presence of fat in the basal diet might be of some importance, experiments were undertaken to decide these points. Two sets of young albino rats were used. Carotene at the level of 0.01 milligramme daily displayed activity even when a basal diet of the fat-free type was used. The pigment still displayed activity when medicinal paraffin replaced arachis oil as a solvent for the test doses, although this modification tended to weaken the growth responses observed.

Effect of Pentose Ingestion on Uric Acid Excretion.

KATE MADDERS AND ROBERT ALEXANDER McCANCE have investigated the statement made by Thomas and his fellow workers that the ingestion of small amounts of pentoses exerts a decided influence on the excretion of nitrogenous bodies by the kidney (*Biochemical Journal*, Volume XXIII, Number 6, page 1173). The experiments were repeated upon three healthy adult males, each being the subject of three experiments, with xylose, arabinose and rhamnose respectively. Five grammes of the pentose dissolved in 100 cubic centimetres of water were taken by mouth on a fasting stomach. Samples of blood and urine were collected at the same time and at intervals throughout the days. Estimations of pentose and uric acid were carried out on the specimens of urine and uric acid estimations on the samples of blood. The methods used for these estimations are given. The results of one typical experiment are given in detail with a graph. The excretion of pentose is almost complete in six hours and there is no rise in uric acid excretion six hours after the pentose is taken, and, although the uric acid excretion is variable from hour to hour, it bears no relation to the excretion of the pentose. The average uric acid excretion was found to be very constant for the three persons tested and certainly did not appear to be affected by the ingestion of pentose. No evidence was obtained from these experiments that the ingestion of pentose had any effect upon the excretion of uric acid.

Special Articles on Diagnosis.

Contributed by Request.

VIII.

BRONCHIECTASIS.

Definition.

BEFORE proceeding to discuss the subject of bronchiectasis, it is advisable to define our conception of this pathological condition. There is a tendency of almost all text book writers on the question to avoid giving a definition. Bronchiectasis, correctly speaking, is a condition of dilatation of the bronchi and it is seldom encountered in its uncomplicated form. As a congenital disease it is so rare that it may be looked upon as a medical curiosity and may therefore pass unrecognized for many years. Simple bronchiectasis too, occurring as an acquired disease, is probably almost as rare. We have therefore become accustomed to apply this term to the condition of dilatation of the bronchi and bronchioles associated with the other pulmonary conditions which to all intents and purposes always accompany it and which are, in all probability, responsible for its development and with the coughing up of varying amounts of a purulent secretion. Pathologically it is an accepted fact that chronic bronchiectasis is always associated with a varying degree of fibrosis along the course of the bronchi and their branches and almost invariably with a varying degree of chronic inflammation of the surrounding lung tissue itself. The lung tissue surrounding the dilatation may be either slightly condensed by pressure, hardened by chronic pneumonia, rarefied by emphysema or more commonly involved in the destructive process. Both lungs are frequently affected, but perhaps more often only one lung is involved and that the right lower lobe. Bronchiectasis may occasionally be caused by a tuberculous process and the two conditions may coexist as separate states in the same lung and these possibilities must be kept in mind.

I prefer to define bronchiectasis, as we have come to call it, as a condition of chronic pulmonary suppuration characterized by dilatations of the bronchi and bronchioles and associated with varying degrees of pulmonary fibrosis. This definition includes all the conditions of both the lung and the bronchi which cause and which maintain the bronchial dilatations.

Causes of Bronchiectasis.

As the causes of bronchiectasis are so much wrapped up in the maintenance of the condition and in its diagnosis, it is right that at least some mention should be made of them in passing. They have been classified by various writers and are here briefly considered.

1. Such conditions as severe bronchitis and peribronchitis, recurrent attacks of bronchitis and peribronchitis, recurrent attacks of bronchopneumonia, delayed resolution of lobar pneumonia and similar infections damage the epithelial lining, weaken the walls and produce a peribronchial fibrosis.

2. The stagnation of secretions and their putrefaction produce ferments which may injure the lining epithelium.

3. Coughing produces an increased pressure on the walls of the bronchi. The phenomena frequently observed following the injection of iodized oil into the bronchial tree, of the distribution of the oil over the whole of a lobe by coughing, demonstrates quite clearly that during the act force is directed within the lung tissue itself. This symptom alone may be a big factor in the maintenance of a chronic lung suppuration. More will be said concerning this when the question of aspiration of infected material from the upper respiratory tract is dealt with.

4. Secretions may collect distal to an obstruction in the bronchial tree and may possibly produce an actual positive pressure which may cause a dilatation of the walls of the bronchi, already weakened by chronic inflammatory processes. Most certainly such an obstructed accumulation of secretion conveys the sudden and forcible positive

pressure, caused by coughing, to the bronchial walls and to the lung tissue itself.

5. It is possible for contracting fibrous tissue in the lung, when pleural adhesions are present, to produce a traction upon the weakened walls of the bronchi and cause their dilatation.

6. Whooping cough, influenza, measles, acute bronchopneumonia, pneumonia or tuberculosis may result in a "honeycomb" condition, that is, acute bronchiectasis, which generally clears up soon after the attack, but which may go on to a chronic state.

7. Embolic pulmonary abscesses, which are much more frequent than is mentioned in text books, may become chronic and by extension of the inflammatory process may lead to bronchiectasis in the ways mentioned in the preceding paragraphs. It has been shown by recent investigations that an acute pulmonary embolic abscess does not develop into a chronic one, except in the presence of Vincent's spirillum and the fusiform bacillus. These organisms, as is well known, are common inhabitants of the mouth and are found in such sites as around the teeth and in the tonsil crypts. Many acute pulmonary abscesses have been reported as occurring after operations upon the mouth and the throat, but in reality they occur just as frequently after operations upon other regions. Operations upon the throat may give rise to localized thrombosis which becomes infected with Vincent's organisms among others, and upon becoming dislodged may form a pulmonary embolism which may develop into a chronic abscess. Much work has recently been done on this question and the reader is referred to publications for further details.

8. Other very rare causes may be mentioned as congenital atelectasis, chronic tuberculosis, syphilitic stenosis of a bronchus, primary epithelioma, aortic aneurysm, mediastinal new growth, enlarged mediastinal lymphatic glands, and pleuritic and pleural effusions, empyema, a large heart, pericardial effusion, ascites, subdiaphragmatic abscess, hepatic tumour, splenic tumour; most of these exert their influence by partially obstructing a bronchus.

Classification.

For practical purposes I classify cases of chronic bronchiectasis into two groups:

I. Those associated with and probably dependent upon chronic suppuration in the upper respiratory tract (which includes oral suppuration).

II. Those cases not so associated which are again divided into: (a) those associated with a long retained foreign body (opaque or non-opaque to X rays) in the bronchial tree, (b) those due to other causes, such as following pertussis, influenza, measles, pneumonia, bronchopneumonia, fibroid tuberculosis, the congenital form et cetera.

As a rhino-laryngologist I am naturally mostly interested in the group I and subgroup (a) of the group II of these cases and in passing I must reiterate as my opinion the statement that by far the greater number of cases of chronic bronchiectasis, so-called, belong to the first group, that is, they are associated with, if not caused by, chronic suppuration in the upper respiratory tract.

As elsewhere in medicine, it should be our aim to diagnose bronchiectasis in its early stages and our ideal to discover the disease in its prebronchiectatic stage and prevent its development. It will be readily understood that the use of the usual forms of investigation, such as palpation, percussion and auscultation, will be of diagnostic use only when the condition has advanced to a very great degree. In other words it is not by the aid of the stethoscope that we diagnose bronchiectasis, except in its very advanced stages, and then its aid is hardly required. That a patient should progress to the state of large cavity formation, clubbed fingers and the other signs of chronic venous stasis and lardaceous disease, before his illness is diagnosed, is a disgrace to the profession and yet we today are still seeing patients in this pitiable condition whose conditions have been diagnosed as, and who have been treated for, pulmonary tuberculosis and what not, when if the condition had been appreciated in its early stages, particularly if due to sup-

puration in the upper respiratory tract or to a retained foreign body in the bronchial tree, much amelioration, if not a clinical cure, could have been obtained by the institution of appropriate treatment in its early stages.

Diagnosis.

The diagnosis of bronchiectasis practically depends upon the facts elicited by the history, the symptoms and the X ray and bronchoscopic findings. These aspects will now be considered.

In a well developed case in an adult the diagnosis is straight forward; the history of a chronic cough which is influenced by change in posture, such as by bending forward or lying down, associated with a copious sputum and showing signs of chronic septic absorption (the appearance is almost typical) should make the practitioner very suspicious, especially if there is an absence of tubercle bacilli in repeated examinations of the sputum. X ray examination will be the final court of appeal, especially if used in conjunction with the injection of iodized oil into the bronchial tree. This will be discussed later.

Symptoms.

Acute Bronchiectasis.

Acute bronchiectasis, often referred to as "honeycomb" lung, is usually found in children and may be more frequent than is accepted for the simple reason that there is no special symptom by which it can be recognized, the symptoms of the condition, such as whooping cough, influenza, acute bronchopneumonia, masking those of the bronchiectasis. Moreover, there is no practical object to be gained by such diagnosis. The condition frequently clears up, but it may persist and become chronic.

Chronic Bronchiectasis.

Chronic bronchiectasis, whatever its cause, has many characteristic symptoms.

Cough.—The cough is a chronic one, frequently dating back to an attack of whooping cough, bronchopneumonia or some such ailment in early childhood, and it has been present more or less since then with periods of amelioration and of exacerbation. It is "loose" in character and usually occurs in paroxysms first thing in the mornings and upon lying down at night. It usually disturbs the patient during sleep and at times may be so persistent that it interferes seriously with his rest. It usually does not, unless the condition is advanced, cause much inconvenience during the day for the reason that the severe paroxysms occurring first thing in the mornings clear out the accumulations of pus from the dilatations and also stronger coughing is indulged in when the patient is up and about. Moreover, when the patient is in the upright position, the secretion lies within the diseased areas and irritation is reduced to its minimum. A considerable amount of secretion can be thus retained in the bronchiectatic and pulmonary cavitations and coughing is induced only when the secretion overflows and irritates the sensitive mucous membrane lining the normal bronchi. However, in advanced bronchiectasis with big cavity formation the cough may trouble the patient considerably during the day whenever there is a change in posture, such as when bending.

Sputum.—Sputum may be considerable and in the advanced cases may amount to as much as a pint in twenty-four hours. Usually in children little sputum may be seen, as it is their habit to swallow it as soon as it is coughed out of the larynx and not to spit it out. This is discussed more fully later on. Classically the sputum separates into three layers on standing and variegated "bodies" are found in it. However, these characteristics are found in other conditions and need be no more than mentioned here. The sputum may be definitely fetid, but this is not the rule and when present suggests rather the presence of gangrene or abscess of the lung or fetid empyema. It may be streaked with blood.

Dyspnoea.—Dyspnoea is seldom present except in a well advanced case and then it is a prominent symptom and is due to an associated dilated heart, emphysema, extreme fibrosis of the lung or fixation of the diaphragm.

Pain.—Pain is not present except when caused by pleural involvement.

Hæmorrhage.—Hæmorrhage, from slight blood-streaked sputum to severe hæmoptysis, may occur in bronchiectasis and is due to the rupture of exposed small vessels or small aneurysms occurring in the walls of the dilatations. A bloodstained sputum is perhaps present more often than is realized and when a child with a chronic cough has such a sputum we may be almost sure the condition is one of bronchiectasis. In those very rare cases in which a thoracic aneurysm is the cause of the bronchiectasis, fatal hæmoptysis may result from its rupture into the bronchus.

Constitutional Symptoms.—Constitutional symptoms usually are not pronounced. Frequently the patient does not complain of feverishness, but he is subjected to attacks which are due to recurrent bronchitis, bronchitis or bronchopneumonia. The cough is then more severe and sweating at night is common. In patients in the mild degrees of the condition little impairment in health is noticed, but as the state progresses a gradual failing off takes place until in the very advanced death results from heart failure, general cachexia or some terminal infection.

Circulation.—As the disease advances, progressive circulatory disturbances may develop. In children a cyanosis is often noticed on cold days and in the very advanced cases "clubbing" of the fingers and other evidences of chronic venous obstruction are usually present. In chronic extensive bronchiectasis "clubbing" is perhaps seen in its most extreme form.

Methods of Investigation.

In the proper investigation of cases of bronchiectasis it is essential to obtain whatever information is possible of the condition of the lungs and of the nasal accessory air sinuses. Examination of the lungs by means of X rays, both before and after the introduction of an opaque substance into the trachea and bronchi (iodized oil is the best material available for this purpose) and direct inspection of the lung by means of the bronchoscope, give very valuable information. All these patients should, as a matter of routine, be subjected to X ray examination of the chest and the nasal accessory sinuses.

Skiagrams of the Chest.

It is now generally recognized that an ordinary X ray picture of the chest does not give sufficient information in cases of bronchiectasis upon which to form an accurate diagnosis. It does tell us, however, that there is a suspicion of bronchiectasis (be it great or small). Chest screening gives details of movements in addition. Although degrees of peribronchial fibrosis are characterized by increased peribronchial linear markings and varying irregular densities generally coincide with cavities and may be evident in patients in the early stages or even in the pre-bronchiectatic stage of the disease, no details of the sizes of the cavities and such information are obtained. The degree of increase in the linear markings does not always correspond to the size and extent of the dilatations and the greatest difficulty may be experienced in interpreting the slight increase in the markings due to a peribronchial fibrosis from such a cause as recurring bronchitis and that due to early bronchiectasis. A "honeycombed" appearance is usually evidence of an advanced stage of the disease. For the matter of simply making a diagnosis of bronchiectasis a picture of the chest in the postero-anterior position and one in the lateral plane may be sufficient in 60% of the cases and these pictures should be taken in all cases before considering the injection of iodized oil into the bronchial tree. Stereoscopic pictures may be a further aid to diagnosis. A radiological abnormality sometimes found is a triangular shadow which is seen at the base of the lung. One side rests on the diaphragm and one along the mediastinum; the hypotenuse runs from the mediastinum to the diaphragm and when it is present on the left side, it may lie within the cardiac shadow and may be easily overlooked. After injection with iodized oil bronchiectasis can be demonstrated within this shadow. Sometimes, in order to obtain fuller details as to the presence of pleural adhesions, it may be of advantage to

produce an artificial pneumothorax. When this diagnostic pneumothorax has been produced, a triangular area of increased density may be seen which represents an atelectatic bronchiectatic lower lobe and corresponds to the triangular shadow described above, but which has been raised by the pneumothorax out of the cardio-diaphragmatic area.

Injection of Iodized Oil into the Bronchial Tree.

To obtain accurate information relative to the nature, location and extent of bronchiectatic dilatations the use of iodized oil is essential. We have at our disposal two well-known preparations for this purpose, "Lipiodol" and "Oliolase," both of which consist of 40% iodine mainly in chemical combination in a suitable oil. Being opaque to the X rays, its presence will be shown in position in the films. The following are the methods of injecting the oil into the bronchial tree.

The first method is by the transglottic route. This consists in injecting the oil from a syringe into the buccopharynx, the patient taking deep breaths during the process. If care be taken not to touch the uvula or the back of the pharynx, the oil will pass directly into the larynx and the trachea. This procedure is carried out without the use of cocaine about the pharynx or larynx and I think it should first be tried before any other method of introduction is adopted. The patient should have the procedure and what is aimed at explained to him and he should be instructed not to cough. The injection should be made in or near the X ray room and the examination by X rays should be immediately proceeded with. During the injection the patient can be placed in the position required to allow of a free flow into the required bronchus. Should this method fail, recourse can then be had to one of the following: (i) A laryngeal syringe, with or without a tracheal rubber tube extension, is used. It is first necessary to cocainize the fauces, buccopharynx and larynx before this can be accomplished. This is done by painting the fauces, pharyngeal walls, base of tongue and with the aid of the laryngeal mirror the interior of the larynx, with a 10% solution of cocaine and one in 5,000 solution of adrenalin. The trachea is likewise anaesthetized by injecting two or three cubic centimetres of a 1% or 2% solution of cocaine from a laryngeal syringe into the larynx by the aid of a laryngeal mirror. (ii) A nasal tube which is directed into the trachea between the vocal cords after cocainization of the larynx and pharynx as described above, can be used. (iii) The method of injection by the bronchoscope requires the skill of a specialist in this branch of surgery and has the advantage that the operator is able to inject the oil into the required position under the guidance of direct vision.

The two remaining routes are by puncture through the crico-thyroid membrane when the needle enters the subglottic region of the larynx, and puncture through the trachea between the upper rings. Both these last two methods can be performed quite easily by first injecting one or two cubic centimetres of a 1% solution of "Novocain" subcutaneously over the site selected and as the iodized oil has a high viscosity, it must be heated to body temperature and a needle of not less than gauge 15 must be used in order to allow of its free flow and ejection from the syringe. The syringe and its attachments, together with the oil in its container, should be heated to body temperature and this can be brought about by immersing them in hot water. For the transglottic route a syringe as large as thirty cubic centimetres is needed (twenty to thirty cubic centimetres or more of fluid are usually required) and the ordinary attachment to the laryngeal syringe is a suitable cannula. In dealing with adults morphine or some barbitone derivative may be given beforehand and with children some compound tincture of camphor. With the patient sitting in the upright position the oil can be injected into the trachea under indirect vision by the aid of a laryngeal mirror and it can be expressed from the syringe almost as fast as the operator chooses. When the injection is made with a needle into the larynx or trachea, the patient should be in the recumbent position. By whatever method oil is introduced into the trachea, it will gravitate to the most

dependent position. It flows into the lower bronchi, but by tilting the patient to either side while the oil is injected, and by putting him into various positions after injection, it can be made to flow into whatever lobe is required. Various types of dilatations are displayed by the oil, such as cylindrical, sacculated, club-shaped, spindle-shaped, "bunch of grapes" and "fingers of a glove," and views taken in different planes will show the position of the lesions and indicate a suitable method of treatment. Stereoscopic pictures may be very useful in localizing the dilatations. To sum up, it may be said that by injecting iodized oil in bronchiectasis we obtain positive evidence of dilatation of the bronchi and of abscess formation *et cetera* and that the picture is characteristic. It is the only positive method of proving the diagnosis without resorting to bronchoscopy and X ray pictures may then be pathognomonic of the pathological condition. Therefore this procedure should be used in all cases of chronic infection of the lung (obvious tuberculous lesions excepted), especially where details are definitely required.

X Rays and Retained Foreign Bodies.

X rays afford the most important evidence of retained foreign bodies. Metallic bodies and many of lesser density, as teeth, bones, buttons, can be displayed. Non-opaque foreign bodies, because they give no shadow, are more difficult to locate. They, however, may produce an obstructive emphysema of the affected side. Screening then shows the diaphragm flattened, depressed and of less excursion on the affected side. At the end of expiration the heart and mediastinal wall move over towards the uninvolved side and the affected lung becomes less dense than the normal lung owing to the retention of air which has been drawn into the affected area during inspiration. This partial obstruction causes obstructive emphysema which must be distinguished from compensatory emphysema, in which the condition is in the unobstructed lung and is compensatory in nature. Pictures should be taken at the end of expiration to get the typical appearance. By noting the extent and area of this obstructive emphysema the definite location of a non-opaque foreign body can be made. When there is a complete blocking of the bronchus, a condition of obstructive atelectasis results. The mediastinal structures move to the obstructed side and stay there. Complete obstruction leads to a "drowned lung" which may be mistaken for empyema. When the foreign body is retained for any considerable length of time, suppurative processes take place and bronchiectatic and lung abscesses develop. After displacement of the foreign body an injection of iodized oil will display the abscess formation which, if the body has been retained for a long time, may involve the whole of the lung area supplied by the obstructed bronchus.

Skiagrams of the Sinuses.

Recent investigators have shown that chronic nasal accessory sinus suppuration is present in at least 82% of chronic non-tuberculous lung infections. It is essential therefore to have an X ray investigation of these cavities made in all cases of chronic pulmonary disease. A single plate is of not much value. Several plates in various positions should be taken, as it is not easy to come to a correct estimate of the state of the mucosal lining of these cavities. It is advisable also to seek the help of a radiologist who has expert knowledge of the subject, since for the purpose of diagnosis it is necessary to establish the condition of the mucosa of these cavities.

Bronchiectasis and Nasal Accessory Sinus Suppuration.

For many years the association of nasal accessory sinus suppuration and chronic pulmonary suppuration in adults has been recognized and within the last few years the association of these two pathological conditions in children has also been freely discussed. Suppuration in the upper respiratory tract may give rise to chronic bronchiectasis and chronic pulmonary abscesses in three ways. Primarily, the latter may develop by the sinus infection predisposing to repeated colds in the head and to a repeated direct extension of the inflammation to the lower part of the respiratory tract and so to chronic bronchitis and peri-

bronchitis and later to bronchiectasis. Secondly, it may develop by an actual infection through aspiration of the pus into the bronchi and its retention there during sleep. Thirdly, we must remember that infections from a septic condition about the upper respiratory tract may be borne by the blood or lymph stream to the lungs and so produce a chronic suppuration there.

It therefore is evident that in the procedure of diagnosing bronchiectatic conditions the presence or absence of suppuration in the upper respiratory tract must be determined, as without this the investigations would not be complete.

Bronchiectasis and Sinus Suppuration in Children.

It is not with the very advanced condition of the disease that we are mainly concerned, but rather with the condition in its early stages as it occurs in young children, for it is here that the institution of appropriate treatment offers more encouraging results.

History.

The history generally is that a cough developed soon after an attack of measles, whooping cough, influenza, pneumonia or some such ailment which occurred in the first eighteen months or so of life, and that it has been present with exacerbations ever since. Apart from the statement that the child may blow his nose frequently and be subjected to colds in the head and chest, mention is seldom made of any nasal troubles. I have seen several children who were brought to me because of chronic suppurating *otitis media*, when during examination a loose cough was noticed; upon further investigation the cough was found to have been chronic and due to bronchiectasis associated with nasal accessory sinus suppuration, the latter being the cause of the chronic aural suppuration.

Signs and Symptoms.

A great number of these bronchiectatic children have a characteristic appearance. So much is this so that when such a facies in a child is associated with a loose, rattling cough, it is suggestive of chronic antral suppuration with bronchiectasis. These little patients on casual observation appear very healthy, whereas they are really far from well. I have applied the term "pseudo-robust" to them. This "pseudo-robust" appearance tends to be replaced as the condition becomes more and more chronic and from the age of nine or ten onwards the patient may appear drawn and sickly and look chronically ill. The parents almost always volunteer the information that they cannot understand why the child looks so well and yet his health is really "up and down"—more "down" than "up". The child has a cough which is usually slight, but it is chronic and frequently disturbs him at night, especially if he lies on his back, and it may be paroxysmal and more evident first thing in the mornings and upon lying down to sleep. He is subjected to feverish attacks and to recurrent colds in the head, bronchitis and pneumonia. He appears to be fat and healthy, but in reality he is flabby. Frequently there is a history of the expectoration of a bloodstained sputum. Upon hearing a loose cough, however slight, in a "pseudo-robust" child the practitioner should immediately be suspicious of bronchiectasis and he should proceed to exclude it. The child should be made to cough forcibly to bring up the sputum into the mouth. It is difficult to make the child do this, for he is in the habit of coughing with just sufficient force to bring the sputum out of the larynx and he then swallows it. It is often necessary to "bully" the patient into coughing up the sputum. If this fails to produce a sputum, a good plan is to hold the little patient upside down or place him in the knee-elbow position or hang his head and trunk over a table or bed and then make him cough. Many parents will express surprise upon the appearance of a thick purulent sputum and will assure the practitioner that they have never previously seen any similar sputum from the child. Many of these children show well developed broad faces and in some instances may have an over-development of the width of the face. This broadness of the face is due, I believe, to the large size of the antral cavities and consequently of the upper jaws due to the

presence of pus within them. Should antral suppuration develop after the child has contracted adenoids, then he may have the typical adenoid facies. I have rarely found bronchiectasis and sinus suppuration present in a child with adenoid facies and then only in the older children, due to the fact that the presence of adenoids had well established the improper development of the upper jaws before the onset of the sinus suppuration. Whenever there is any suspicion of sinus disease, one nearly always finds pus in the nose. The practitioner must keep in mind that the little patient has usually been made by his parents to blow his nose while awaiting examination and so sometimes little pus may be found upon examination immediately after such an action. There is usually a nasal obstruction of varying amount—usually there is a middle turbinate obstruction. Adenoids and septic tonsils too are usually an accompaniment and may be the cause of the sinus suppuration, removal of which in a certain number of cases is sufficient to clear it up.

A patient giving the above history and symptoms, should be considered as having bronchiectasis and X ray examination should thereupon be undertaken. The physical signs which may be discovered upon examination of the chest by inspection, palpation, percussion and stethoscopic examination, will be found fully described in text books. As pointed out previously, they are discovered only in the advanced states of the disease and a diagnosis can then generally be made without such evidence.

X Ray Findings.

As a matter of routine these patients should be subjected to X ray examination both of the chest and of the nasal accessory sinuses. Pictures of the accessory sinuses should be taken in several planes in order to determine the full extent, if present, of the sinus suppuration, and the state of the lining mucous membrane changes. As a preliminary ordinary postero-anterior and lateral views of the chest should be taken when a suspicion (great or small) of bronchiectasis may be manifest. Peribronchial fibrosis is evident in an increase in the peribronchial markings and dilated bronchi, when viewed end on, may be evident. Cavity formation may be evident by irregular densities and a honeycomb appearance indicates an advanced state of the disease.

Screening of the chest gives details of movements of the lungs and the diaphragm, but generally only suspicions of the pathological condition are obtained by these methods.

For further details it is essential to take pictures after iodized oil has been injected into the bronchial tree. The use of this method of investigation is very limited in young children, for it is generally necessary to give the little patient a general anaesthetic in order to inject the oil into the trachea *via* a needle inserted between its upper rings or *via* the bronchoscope into the bronchi, and then the rapid heart beat and respiratory movement make the taking of satisfactory pictures almost impossible. Likewise, if the patient is allowed to come round before the pictures are taken, the oil may be ejected from the bronchial tree by the vomiting associated with the anaesthetic. Should the practitioner be present at the screening, he can learn a great deal concerning the position, form and the extent of the dilatations. In older children injections of iodized oil *via* the glottis may generally, with the aid of kindly encouragement, be done under local anaesthesia. More details on this aspect of the question are given in previous sections.

Bronchiectasis and Retained Foreign Body.

It is obviously essential for the practitioner to distinguish between bronchiectasis due to sinus suppuration and that due to a retained foreign body. In the latter case the outlook is very promising, provided the foreign body is removed and the earlier this is done, the better the prognosis.

Usually a history of the inspiration of a foreign body can be elicited from the patient, if he is old enough, or from the parents and periods of dyspnoea may have been noticed and reported. There is usually a chronic cough which at times may be most persistent and which is usually

influenced by posture. In some cases coughing bouts have been known to last without cessation for days at a time. Such a symptom of long continuous coughing should make the practitioner very suspicious of a retained foreign body. Should definite bronchiectatic cavities have developed, then a copious purulent secretion will be present. Asthma may be a symptom in this group of cases. Usually X ray pictures of the lung in such an instance are more or less typical of the condition, so that there should be no difficulty in distinguishing it from a bronchiectatic abscess from other causes. More details have already been given in the section dealing with X rays.

Differential Diagnosis.

Chronic Bronchorrhea.

In practically all cases of suppuration of the nasal accessory sinuses there is an aspiration of septic material into the bronchi. In some instances this may be so great that the patient may present the symptom of a chronic cough with the expectoration of a copious purulent secretion and from this symptom may be labelled as suffering from bronchiectasis. However, it will be found that upon clearing up the suppuration in the upper respiratory tract, the bronchial symptoms will rapidly disappear. Similarly in definite bronchiectasis associated with chronic accessory sinus suppuration, there is in a large number a rapid improvement in the symptoms of cough and purulent sputum and in some cases this progresses to a complete cessation of both. Such a behaviour is strong evidence that the aspiration of the infected material is the cause of the bronchiectasis.

Chronic Bronchitis.

Chronic bronchitis may be very difficult to distinguish from early bronchiectasis; both may have similar symptoms and X ray appearance may be identical. Injection of iodized oil may show up the bronchial dilatations. Both conditions may be associated with suppuration in the upper respiratory tract. In advanced states of bronchiectasis the paroxysmal cough, copious expectoration and the X ray findings will be distinctive.

Pulmonary Tuberculosis.

Pulmonary tuberculosis may be difficult to distinguish from bronchiectasis, especially as the former may be responsible for bronchial dilatations and also because tuberculosis in one part of the lung may be associated with bronchiectasis in another part. In cases of apical bronchiectasis the distinction may be very difficult. Repeated examination for the tubercle bacillus should be made. The history, mode of spread and X ray examination will greatly assist. It frequently happens that chronic bronchiectasis is mistaken for chronic pulmonary tuberculosis. The fact that the patients have had a long history of coughing (many dating this symptom from early childhood), the maintenance of a fair state of health in spite of the copious expectoration of purulent material and the absence of tubercle bacilli in repeated examinations of the sputum, together with the X ray findings, should be sufficient to make a correct diagnosis possible.

Abscess and Gangrene.

Abscess and gangrene have an acute onset and course. The patient appears very ill, he displays a septic type of temperature and examination of his blood shows an increase in leucocytes (often to a marked degree). The sputum is usually typical of the condition and is referred to as "prune juice." There is a characteristic offensive odour of the breath and X ray pictures show a circumscribed area of increased density. Both conditions are more rare than bronchiectasis.

Fœtid Empyema.

Fœtid empyema may simulate bronchiectasis by rupturing into a bronchus by a fistula or by the soaking of pus through spongy lung tissue into a bronchus and the expectoration of a copious foul sputum. It is generally an acute disease and the patient is seriously ill. There is usually a history of the pneumonia or the pleurisy of

onset and there is evidence of mediastinal pressure and cardiac displacement. X ray examination will reveal the empyema.

Concluding Remarks.

It is realized that to treat this subject fully would require a volume and in this article many minor points are omitted. However, it is my hope that the above remarks at least emphasize the importance of the relationship of suppuration in the upper to that in the lower respiratory tract, particularly in regard to chronic bronchiectasis. Cases of this group appear to be on the increase and I consider that it is the duty of the profession to aim at preventing the progress of bronchiectasis by diagnosing it in the early stages. I consider that all patients with chronic cough as a symptom should be subjected to early investigation and that the possibility of suppuration in the upper respiratory tract as the causative factor eliminated before the pulmonary condition has become established.

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British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, on June 26, 1930, Dr. E. M. HUMPHREY, the President, in the chair.

Spinal Tuberculosis.

DR. WILFRED VICKERS read a paper entitled: "Tuberculous Disease of the Spine" (see page 251).

DR. D. J. GLISSAN read a paper entitled: "Early Symptoms and Treatment of Tuberculous Disease of the Spine" (see page 253).

DR. H. R. SEAR showed a series of lantern slides of diseases affecting the vertebrae, discussing briefly the characteristic features of each. As regards tuberculous spines, numerous films were shown, some of early stages. Dr. Sear stressed the fact that in his experience the primary lesion was in the substance of the bone, thereby differing from the view of some American radiographers who thought that the first involvement was in the intervertebral disc. He pointed out that in the antero-posterior skiagram the disc often appeared markedly decreased, whereas the lateral skiagram might show quite a wide space between the vertebral bodies. The differential diagnosis between tuberculous spines and typhoid spines was demonstrated and the features of secondary newgrowth displayed. The rarer lesions dealt with included syphilis of the vertebrae, *osteitis fibrosa*, both of the cystic and diffuse fibrous type, osteomalacia, lymphadenoma of the vertebrae, Calvé's disease, congenital deformities, Paget's disease, osteopetrosis and achondroplasia.

DR. W. B. DIGIT congratulated the speakers and said that he had been especially interested in Dr. Sear's remarks. He agreed with Dr. Glissan that early X ray evidence of a tuberculous lesion in the spine might be lacking. They were generally asked to undertake an X ray examination after deformity was obvious and at this stage the diagnosis could as a rule be made from clinical appearances alone. He agreed with what Dr. Sear had said about the intervertebral space and the destruction of the vertebral body. Concurrently with involvement of the disc there was destruction of the body, but he had never seen an instance in which loss of intervertebral space was the first manifestation. In malignant disease the most obvious change was destruction of the body of the vertebra rather than interference with the joint spaces. In severe injuries to the vertebral column, crushing of

the vertebral body was seen rather than loss of the joint spaces.

Dr. Dight then made reference to a condition which was discussed by Alban Köhler in his book "Röntgenology" (1928). This condition had been described by Scheuermann and termed by him *osteochondritis deformans juvenilis dorsi*. Köhler referred to this condition as occurring from the fifteenth to the seventeenth year. He stated that it was a dorsal kyphosis, appearing principally in males, and he believed that its cause was to be found in pathological changes of the epiphyseal line. Another author called this condition *kyphosis osteochondropathica*. The changes consisted of considerable irregularities and deformities of the shadows of the epiphyseal discs; the upper and lower surfaces of the vertebrae were irregularly defined and the irregularity was especially well marked at the anterior edge of the body of the vertebra in what might be a pronounced cup-like fringing. At the same time a more or less pronounced atrophy of the affected body of the vertebrae was found. The wedge-shaped deformity of the separate bodies might be very different in degree and in extreme cases a suspicion of tuberculous destruction of bone might be aroused. Dr. Dight explained that this description was given by Köhler and it was on account of this possible suspicion of tuberculosis that he (Dr. Dight) had referred to Köhler's views. Köhler went on to state that the characteristic irregularities at the upper and lower corners of several of the neighbouring vertebral bodies prevented a confusion of the condition with tuberculosis. The disease, according to Köhler, was always limited to the lower dorsal region (from the seventh to the tenth dorsal vertebrae) and never appeared in the upper dorsal region or in the cervical and lumbar regions. There was usually an entire absence of pain and it was the deformity that brought the patient to the doctor. Dr. Dight said that this condition corresponded with Perthes's disease and Köhler's disease, and those who originally described the condition, believed that it represented the mechanical effect of weakened bone structure acted on by stresses such as the carrying of heavy weights.

DR. R. B. WADE thanked the speakers and said that he could deal only with the condition as it was seen in children. In the early stages there was a striking absence of acute pain. Most patients were brought to the doctor with a gibbus and it was thus obvious that the disease had been present for some considerable time in order to allow such crushing to occur. In regard to diagnosis two signs were always mentioned in the text books. One was pain on percussion and the other was pain on passing a hot sponge over the affected area. In his experience these two signs were always conspicuous by their absence. In the early stages of the disease the two main signs were rigidity and posture. For example, the child with cervical caries supported the chin in the cupped hands in order to transfer part of the weight to another part of the skeleton and the child with involvement of the lumbar vertebrae supported part of the weight by placing his hands on his knees. In lumbar involvement there was an exaggerated lordosis, the body being held in the erect soldier's stance. A common change was the appearance in the X ray picture of surrounding caseation; caseous thickening occurred in the intervertebral spaces with fusiform swelling.

As far as treatment was concerned, they had not advanced a great deal in the last fifty years. Only variations of treatment had taken place. They had to acknowledge that the disease ran a long course and the result was usually accompanied by a deformity. They had not very much to be proud of in their splinting methods. This was perhaps to be expected, for splints acted only as an exoskeleton and, assuming that complete rest and immobilization were desirable, they were only trying to imitate nature. They had to acknowledge that their splints were not much good and in fact this was obvious from their multiplicity. If one good splint had been improvised, it would have been adopted to the exclusion of all others. Dr. Wade then referred to the newer operative methods: the Albee method of bone grafting and the Hibbs method of bone fusion. Dr. Wade held that they had a long way to go before they gathered sufficient data to justify the

drawing of definite conclusions as to the value of these methods. The question had to be regarded from two points of view. In the first place, was operation undertaken in order to limit the duration of treatment? He held that they had not sufficient figures to prove this point. In the second place, was bone fusion going to limit the deformity? If patients were subjected to this type of operation while they were yet in the early stages of the disease, they should derive considerable benefit. Fusion was used extensively in other parts of the world, notably in America; it was perhaps used to excess and too much might be expected from it. It had been said that patients were sometimes allowed to walk within a few months of fusion. Dr. Wade thought that it was far too much to expect satisfactory results to be obtained in these circumstances. The pendulum had perhaps swung too much in the opposite direction and they were now told that operation should not be attempted in children under twelve years of age. It was necessary to emphasize the fact that fusion was difficult of attainment in any joints in children under twelve or fourteen. Fusion could be carried out, however, and good ankylosis could be obtained, but not quickly. They all knew how difficult it was to bring about fusion in a knee joint and that the hamstrings would pull the apposed surfaces out of alignment unless splinting were carefully carried out. Immobilization had to be maintained for periods up to six months. If tuberculosis of the spine in children were looked at from this point of view and splints were applied for months after fusion operations, they might perhaps obtain better results. When they looked at tuberculosis of the spine they were disheartened because no satisfactory reports of the results of any one method were available. A surgeon generally tried several methods until he found one which suited him. In this way there was no uniformity of treatment in any one institution and they could not obtain figures in regard to either duration of treatment or resulting deformity. For this reason he raised the question as to whether more might not be done in public hospitals as far as standardization of treatment was concerned. Not only was this necessary, but the follow-up system should be used more extensively. At present they often did not know whether the patient was cured or what the position in regard to deformity was.

DR. JOHN HOETS thanked the readers of the papers and referred to the question of pain. Tuberculosis of the spine frequently produced no pain in children, but pain was constantly found in adults. He referred to a man who had consulted him some years previously for what seemed to be an ordinary attack of lumbago. He had ordered what appeared to be appropriate treatment and had not seen the man for five years. The patient had then manifested well marked spinal tuberculosis and a lumbar abscess. It had transpired that the patient had had one testis removed for tuberculosis twelve years before the first visit. With the commencement of pain in the back he had consulted numerous medical practitioners and had never allowed one of them to see him more than once. Dr. Hoets laid emphasis on the fact that spinal tuberculosis was often a secondary manifestation of a tuberculous focus in another part of the body and on the necessity for bearing this fact in mind in outlining treatment. He said that the treatment of adults was an exceedingly difficult matter in metropolitan hospitals. The Royal Alexandra Hospital for Children was fortunate in that it had a branch institution at Collaroy where children could be sent and where they could be kept under observation for long periods. What was really needed was an institution where adults with bone tuberculosis could be kept for periods of a considerable length. In regard to fusion, there was a danger of this procedure becoming too popular and there was also a tendency to allow the patient to get on to his feet before the general condition received adequate treatment. He had seen a patient in whom a fusion operation had been carried out and in whom healing of the fused area had occurred. The disease had broken out again above the area of fusion and collapse of the vertebrae had taken place. He had thought at the time that if no fusion had been performed, the patient might have been watched more carefully and recovery might have occurred,

instead of disaster. He referred to observations related by Dr. Allison during his recent visit. The latter had seen a series of observations carried out on several groups of tuberculous patients. Ten had been treated by Rollier's methods, ten had been treated in hospital wards and ten had been treated either in the sun on the veranda or in the shade or indoors, according to the changes in the weather, by what might be called instinctive treatment. The net result had been checked and it had been found that the treatment by "instinct" gave the best results.

Dr. Vickers, in his reply, said that the adoption of heliotherapy depended largely on the climate. For instance, in New York they could not do what was possible in other parts of North America. In Toronto they were said to have two seasons, winter and July, while in England the summer was said to vary: "last year it occurred on a Thursday." In Australia they were fortunate. Of course, Gauvain, in England, had a place where he could adopt heliotherapy. At the Royal Alexandra Hospital for Children they did not claim all that Rollier claimed, but they did think that the tanning of the skin acted as a tonic. It was necessary to utter a warning in regard to fusion. It was spectacular and surgeons might possibly think that treatment did not extend beyond the performance of the operation.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Melbourne Hospital on May 21, 1930. The meeting took the form of a series of clinical demonstrations by the members of the honorary staff. The first part of the report of this meeting was published in the issue of July 19, 1930.

Renal Calculus.

DR. MERVYN STEWART showed a male patient, aged twenty-two years, who had complained of pain in the left iliac fossa. He had suffered from jaundice several years previously. The pain had lasted for seventeen days; it had commenced in the left iliac fossa and had worked towards the umbilicus and had disappeared after five days. He had vomited twice during the attack. Two days before admission there had been difficulty with micturition. There had been no scalding, but the urine had been dark coloured. The patient had felt that he wanted to pass more, but had not been able to do so. No other definite symptoms had been present.

On examination he had appeared to be a healthy man. His temperature had been 37° C. (98.6° F.), his pulse rate 72 and respiratory rate 22 in the minute. His tongue had been covered with brown fur and moist; his breath had been offensive. The urine had had a specific gravity of 1.020 and had been loaded with polymorphonuclear leucocytes; no red blood cells had been present. The heart and lungs had been clear. On examination of the abdomen both recti had been tense and on guard. The left costal margin had been tender, but no abnormality had been discovered laterally. The central nervous system had been normal. The leucocytes had numbered 17,000 per cubic millimetre. In skigrams taken on March 4 and 19, 1930, twenty-two stones had been discovered in the left kidney and this organ had undergone ptosis. The function of the right kidney had been normal and no dye had been excreted from the left ureter. Sodium iodide solution had been passed into the left kidney pelvis and this had been found enormously dilated. No calculi had been seen in the right kidney. The blood urea had been twenty-one milligrammes per hundred cubic centimetres. The figures from the urea concentration test had been 2.80%, 2.90% and 3.00%. Left nephrectomy had been performed on March 27, 1930. The kidney had been very adherent. The stones had consisted of calcium and magnesium phosphate and of a small amount of calcium carbonate and for this reason post-operative treatment had consisted in the administration of sodium acid phosphate.

On April 3, 1930, the patient had complained of slight pain in the right iliac fossa and a few days later the pain had shot up to the right loin and down towards the testis. The pain had not been aching in type and

no colic had been present. On April 28, 1930, the right kidney had again been examined by X rays and three or four faintly elongated shadows, thought possibly to be due to calculi, had been discovered in the right kidney. The temperature had remained slightly above normal. "Eufavin" had been given intravenously so that the urine might be kept saffron coloured. The patient had passed a small amount of gravel for a few days and had only occasional attacks of aching pain in the right loin.

Paget's Disease.

Dr. Stewart's second patient was an unmarried woman, aged fifty-two years, who had attended the out-patient department on the first occasion on October 24, 1921, with a history of having injured the left leg sixteen years previously; for this she had been attended by Dr. Noyes at the Melbourne Hospital for nine weeks. She had been told that the condition was not a fracture, but the leg had been opened for some abscess condition. At this time there had been considerable thickening with definite antero-posterior bowing and a spot of considerable tenderness at the junction of the middle and lower third of the tibia. The right leg had appeared to be normal. The radiologist had reported that the skogram of the left leg indicated chronic osteomyelitis with condensing osteitis, but no definite sequestrum. The Widal test for both *Bacillus typhosus* and *Bacillus paratyphosus* had been carried out, but no reaction had been obtained. A partial reaction had been given with the Wassermann test. A second skogram had revealed a small sequestrum.

On February 2, 1922, the sequestrum had been removed by operation and twenty-one days later spontaneous fracture of the tibia had occurred 17.5 centimetres (seven inches) above the ankle joint, ten centimetres above the site of operation. Union had occurred and had been complete in four months and at this time a change of a similar nature had been noted on the right leg. Since then the condition had slowly progressed in both legs. Sometimes there was a discharge from the left leg. Skigrams of other bones had failed to reveal any abnormality. No reaction was obtained with the Wassermann test and iodide therapy had been used throughout. Dr. Stewart said that the X ray appearances were considered to be more suggestive of Paget's disease than of chronic osteomyelitis or of *osteitis fibrosa cystica*.

Dr. Stewart also showed a married woman who had attended the out-patient department on March 5, 1930, complaining of severe pain in the left hip, shooting down the thigh and round to the rectum, aggravated by walking, which was becoming more difficult. Pain had been present ever since a fall on the left knee eight years previously. The patient walked with a definite limp, tilting the pelvis down on the left side and swinging it while walking. She had had no pain in any other part of the body. On examination there was considerable limitation of movement of the left hip in all directions, but especially on abduction and external rotation. There was some muscular wasting and there was shortening in the femur to the extent of 1.25 centimetres (half an inch). On examination of the chest there was no cardiac enlargement and the sounds were clear; there was no evidence of arterial thickening. The systolic blood pressure was 140 and the diastolic pressure 82 millimetres of mercury. The urine had a specific gravity of 1.010, was acid and free from albumin and sugar. X ray examination revealed typical Paget's disease of the upper end of the left femur and pelvis, with arthritis of the left hip joint and much loss of cartilage. Further skigrams revealed the presence of Paget's disease of the skull, of both femora and of the right tibia. The Wassermann test had not yet been carried out.

Hodgkin's Disease.

Dr. Stewart's last patient was a woman, aged thirty-six years, who gave a history of nervousness, loss of weight, of appetite and of energy for the past nine months. A blood examination had been carried out on January 31, 1930, with the following results:

Erythrocytes, per cubic millimetre	4,380,000
Hæmoglobin value	63%
Colour index	0·7
Leucocytes, per cubic millimetre	6,350
Neutrophile cells	47%
Eosinophile cells	0%
Basophilic cells	0%
Small lymphocytes	17%
Large mononuclear cells	2%
Myelocytes	3%
Old metamyelocytes	16%
Young metamyelocytes	15%

No abnormalities had been found among the red cells. The history of the patient's illness was that she had felt nervous for the past eight or nine months, following the occurrence of an accident to her son. She had suffered from anorexia and had lost 18·9 kilograms (three stone) in weight. The patient had had no energy, had been short of breath on exertion and had had weak turns two or three times a day. For several months she had had a painless swelling in the left axilla; apparently this was not increasing in size. Occasionally the patient had vomited before breakfast. She had become pale; she had no other symptoms.

On examination the woman had been pale and thin, her pulse had been 126 in the minute and regular, the temperature 36·0° C. (96·8° F.). In the left axilla there had been several firm, discrete, non-tender, enlarged glands. Those situated highest up had been largest and seemed somewhat adherent to deeper structures. The lower glands had been freely movable. No enlarged glands had been found in other areas. No enlargement of the liver or spleen had been detected. The patient had been treated by arsenic and Blaud's pills. Operation had been performed on the day after admission and the axillary glands removed. A frozen section had been reported as probably malignant, but the macroscopical appearances had not been those of malignant disease; they had been of uniform consistency and had not infiltrated the surrounding tissues. They had been sent for microscopical examination. The pathologist had reported that the condition was probably Hodgkin's disease. X ray examination of the chest revealed a suggestion of widening of the upper mediastinal shadow. No reaction had been obtained with the Wassermann test. The patient was receiving X ray treatment in the out-patient department.

Herpes of the Geniculate Ganglion.

Dr. G. C. SCANTLEBURY showed a woman, aged twenty-eight years, who was suffering from herpes of the geniculate ganglion. The patient had reported on May 1, 1930, complaining of pain of six weeks' duration in the left ear and on the left side of the head. "Blisters" had appeared one week after the onset of the pain. Left facial weakness had developed shortly afterwards. Giddiness had at times been pronounced. Left facial paresis was still present, but the "blisters" had disappeared.

Lateral Sinus Thrombosis.

Dr. Scantlebury also showed a boy, aged nine years, whose illness had commenced early in April, 1930, with a cold. Paracentesis of the tympanic membrane had been performed on April 7 for acute *otitis media*. Fever had persisted and Schwartz's operation had been performed on April 9. A rigor had occurred within twenty-four hours with vomiting and signs of lateral sinus thrombosis. The sinus had been opened on April 10 and packed; the jugular vein had been tied in the neck. After slight improvement the patient's condition had become worse, with a swinging temperature, and on April 19 *Streptococcus haemolyticus* had been cultured from the blood. "Acriflavine" had been given by intravenous injection in a 5% solution, a dose of one cubic centimetre bringing about considerable improvement and a fall of the temperature to normal within thirty-six hours. A second dose of two cubic centimetres had been given a week later and two days after this the temperature had come down to normal and had remained normal. The patient appeared to be cured, the wound had granulated and was nearly healed.

Basal-Celled Carcinoma.

Dr. Scantlebury also showed a man, aged sixty years, who had reported on December 10, 1928, with a history of earache for two years. He had been operated on at Saint Vincent's Hospital and a specimen had been removed. This had been reported as malignant and the patient had been sent to Melbourne Hospital. The patient's hearing had gradually got worse and he had had occasional attacks of giddiness, but there had been no definite rotational elements in the attacks. He had not fallen. On examination some tissue with an appearance suggestive of malignant disease had been seen with the nasal speculum, but no idea had been obtained of the extent of the tissue. The patient had not been totally deaf in the right ear—the labyrinth had not been destroyed by the growth. On January 4, 1929, a radium applicator had been applied to the external auditory meatus of the right ear. On May 4, 1929, at operation by the mastoid route the whole of the right auditory meatus with the tympanic membrane and the malignant tissue had been removed in one piece. A portion of some doubtful infiltration had been sent for section, also some of the posterior mastoid cells and the whole of the external auditory meatus. Radium had been placed in the wound. The growth was a basal-celled carcinoma.

MEDICO-POLITICAL

THE following transactions took place at the meeting of the Council of the Victorian Branch of the British Medical Association held on July 23, 1930.

A paragraph had appeared in a daily newspaper to the effect that the Chinese Consul in New South Wales had been instructed by the Chinese Government to register Chinese herbalists. It was resolved to bring this matter under the notice of the Chief Secretary for Victoria and to lodge a protest against such interference with the prerogative of the State.

A conference has been arranged between the Hospital Subcommittee of the Council and the medical superintendents of the metropolitan public hospitals with a view to coordinating the work of providing beds for patients and in order to consider the question of out-patients receiving medical attention only upon receipt of a certificate from an outside practitioner.

Members of the Council and of the Melbourne Permanent Committee for Post-Graduate Work in Victoria entertained Professor Evarts Graham at supper on Friday, July 25, at the close of his final post-graduate lecture.

The question of payment for treatment of infectious diseases in wards of public hospitals has frequently come before the Council. The Charities Board some few years ago ruled that medical practitioners were allowed to charge for infectious cases where arrangements had been made with the municipality from which the patients came.

Later, the State Treasurer directed that the Treasury practice of disallowing the doctors attending such patients to charge fees should be adhered to. The custom was for medical practitioners to charge and it was resolved to oppose the principle of non-payment if an attempt were made to carry it out. The Council was not aware of any law to prevent medical practitioners from charging in such cases. The Council was unable to arrange with the Premier for a deputation on the subject. In regard to the Infectious Diseases Hospital at Fairfield, a separate act of Parliament governs the practice. A private practitioner may attend a patient only in consultation with the resident medical officer and he must look to the patient for the consultation fee.

The Sir George Syme Memorial Booklets have been distributed amongst those members of the profession who desired to possess a copy. There are still a number available for members of other States on application. Bound copies are being presented to the libraries of each of the other States, to Lady Syme, to the Medical School, Melbourne University, to the Federal Committee and to the

College of Surgeons of Australasia, with which two last bodies Sir George was so intimately connected.

It was resolved to endeavour again to collect information with regard to the early medical practitioners in Victoria and Dr. Felix Meyer has been asked to give his valuable aid. Anyone who could supply information on early medical history should communicate with Dr. Meyer or the Honorary Secretary of the Victorian Branch. In this connexion the Council would gladly receive early numbers of the *Speculum*, as there are a number of gaps in the continuity of this magazine in the Library of the Medical Society of Victoria.

Other Matters Considered During the Year.

The following matters have been considered by the Council during the year.

Various questions as to the interpretation of the lodge agreement have received answers from the Council. A lodge medical officer is not entitled to charge for the reduction of fractures and dislocations, even though he administered an anaesthetic; he would be entitled to charge for the anaesthetic.

By an arrangement with the Repatriation Department made by the Federal Committee and afterwards confirmed by the Branch, widows and dependants of deceased soldiers are treated at lodge rates by the lodge medical officers, but the Repatriation Department refuses to be responsible for mileage. Lodge medical officers are instructed to collect the mileage fee for themselves.

The practice of transferring members to a country lodge when such members are visiting on holidays, is quite in order if done in proper way. The medical officer always has the right to refuse to take a transferee on his list.

A medical officer of a lodge is entitled to charge for opening and curetting a carbuncle under an anaesthetic.

An application was made from a company operating in the country for its members to pay into a fund sixpence per week which would be paid to the medical practitioner for medical services. The Council did not approve of this policy, but adhered to its former policy of the formation of a pool from which could be paid 10s. 6d. per consultation or visit.

A lodge secretary failed in his duty of supplying a list of members to the medical officer; a member was treated as a private patient and charged 10s. 6d.; the lodge secretary then supplied a list and deducted 10s. 6d. from the medical officer's salary. The Grand Secretary agreed with the Council's ruling that the lodge secretary had no right to deduct this amount.

A medical officer had been treating a lodge member who disclosed the fact that his income prevented him from being eligible for medical treatment. He was advised to submit his private account to the patient, who should adjust with the lodge secretary.

Members have frequently inquired per telephone or letter as to what extent they would be permitted to disclose confidential information received during their professional attendance upon patients. The Council adopted as a starting point the resolution of the Royal College of Physicians: "Information gained in their professional capacity should be communicated by medical practitioners to nobody." In the case of life assurance companies members should refuse to supply any information whatever without receiving the consent in writing of the executor of the deceased.

In regard to the Repatriation Department, a member would be right in refusing information with regard to a former patient who was an inmate of the Royal Park Mental Asylum, but he would be justified in supplying the information, if permission were obtained from the lawful guardian of the insane person.

A medical practitioner should not disclose to a solicitor the state of mind of the deceased unless he has the authority in writing from the executor.

Where evidence is to be given in a court, the position depends on whether the action is criminal or civil. In criminal cases a medical practitioner when called as a

witness is bound if asked, and if the question is pressed and allowed, to disclose every communication, however private and confidential, which has been made to him while attending a patient in his professional character.

On the other hand, no physician or surgeon shall without the consent of his patient, divulge in any civil suit, action or proceeding (unless the sanity of the patient is the matter of dispute) any information which he has acquired in attending the patient and which was necessary to enable him to prescribe or act for the patient.

The Crown Solicitor has ruled that there is no authority to give permission to any medical man to supply clinical notes regarding a lunatic.

A difficulty has arisen in regard to the supply of *locum tenentes* to practitioners in Tasmania in emergencies or for short periods. The *Medical Act* of Tasmania provides that no medical practitioner can practise, prescribe or administer medicines or give a certificate unless he is registered with the Medical Board of Tasmania. The Board insists on this position to the letter. The Tasmanian Branch has been informed of the difficulty of supplying medical assistance under the present Act or its administration.

There is in contemplation the formation of a representative meeting on the lines of the Annual Representative Meeting in Great Britain. The proposed amendments of the rules have been submitted to the parent association for advice. It is suggested that each country subdivision shall appoint two members or as many more as shall be decided by the Council, acting on the quota of twenty-five members of subdivisions per member appointed. Each metropolitan subdivision shall appoint four members or as many more as shall be decided by the Council, acting on the quota of thirty members of subdivision per member appointed.

A special meeting of the Branch amended the rules so as to provide for the nomination by the Victorian Medical Women's Society of one woman member on the Council. Dr. Constance Ellis has been appointed for the balance of the current year.

The Council has resolved that the election of representatives on the Council by subdivisions shall be carried out in the same manner as for the general election, namely, by ballot. This question will come before the special meeting of the Branch in September.

The Council resolved to appoint as associates all those who had for a long continued period been members of the Association and having retired from active practice, desired to resign. Associates receive notices of all meetings. They pay no subscription, do not receive the journals and they have no right of voting in any matter concerning the Branch.

By some arrangement in New South Wales with insurance companies 7s. 6d. per visit or consultation is the fee charged. A case came before a suburban court in Victoria in which the solicitor for the defence informed the court that the British Medical Association had agreed to accept 7s. 6d. only and on this evidence the case went against the plaintiff. The Council found it necessary to insert a letter in the *Argus* denying that such agreement had been come to with the Victorian Branch. Later the same company with offices in Sydney and operating in Victoria relied on the same plea, but without avail. This would appear to be still one more instance in which it is desirable that uniformity in medical matters should prevail throughout all the States. Such vagaries only tend to confusion.

The question of contributory schemes has caused the Council much concern for the past three or four years. Such schemes exist in various parts of Victoria, but owing to the vigilance of the Council, such contributions paid by employees do not confer any greater privileges on such contributors at public hospitals than those of non-contributors. Each applicant for admission has his rights determined by the *Hospitals and Charities Act*. He must be either in destitute circumstances or have insufficient means to pay for outside medical attention. In emergency cases, of course, there are no income restrictions.

Obituary.

FRANCIS WILLIAM WATSON MORTON.

MENTION was made in the issue of May 31, 1930, of the death of Dr. Francis William Watson Morton. We are indebted to Dr. W. Kent Hughes for the following notice and appreciation:

Francis William Morton who died on January 26, 1930, was the son of William Nassan Morton, merchant, of Auburn, Victoria. He was educated at the Hawthorn Grammar School when it was in its prime under Professor Irving.

He began his medical course at the Melbourne University and subsequently proceeded to Edinburgh, obtaining the triple qualification in 1882. He went to America as surgeon to the steamship *Australia* and practised with his uncle, Dr. E. Morton, for two years in Toronto.

In 1884 he was assistant to the late Dr. O. V. Laurence in Fitzroy, Melbourne, and later started on his own account in the same suburb and built up a very large practice which he carried on without a break for twenty-eight years. The enormous strain would have broken the spirit of most men, but he maintained his splendid vitality to the end. How he stood it passes my comprehension. His physical powers of endurance were the admiration of his intimate friends and at seventy-three he was as full of vigour as many men thirty years younger. He was a sound surgeon and, despite his busy life, kept himself well abreast of the developments of his specialty. For many years he was Surgeon to the Women's Hospital, Melbourne, and Saint Vincent's, being one of the men who built up its reputation in its early days.

The Secretary of the Women's Hospital writes: "Dr. Morton was for many years connected with this institution and worked untiringly in its interests. He gave of his very best and the hospital owes much to the long and skillful service he gave to it."

To the Melbourne District Nursing Society he devoted a large amount of time and they are considering what permanent memorial they can erect to keep alive the memory of his devoted service.

For forty-two years he held the position of Medical Officer of Health to the City of Fitzroy. In his hands this was no sinecure, as here in everything he undertook he gave of his best.

Fond of all games, he played vigorous tennis until quite late in life.

Through his assistance and by his persuasion the Church of England undertook the initiation of the important hospital St. Ives which is now so successfully managed by the Sisters of the Community of The Holy Name.

He was just as keen on doing some one a good turn as he was on bringing a difficult operation to a successful issue. He was an ardent churchman and lived a life of active piety and gave liberally to the church.

A fellow Lay Canon of Saint Paul's writes: "His whole life seems to have been made up of 'that best portion of a good man's life—the little nameless, unremembered acts of kindness and of love.'"

The Chief Executive Officer at Saint Paul's Cathedral says: "I shall miss the doctor terribly at the Cathedral. He was always so interested in everything and seized every opportunity of saying kind words of encouragement in his courteous and gentle way. He has been a true friend to the clergy, placing his knowledge and skill at their disposal without one thought of pecuniary reward, and we honour and thank him."

All through his adult life he was a faithful Mason and held many high positions in the Grand Lodge of Victoria besides being a Past Master of the Combermere and University Lodges.

Will Morton was more than a sound surgeon and an excellent general practitioner. He was a wonderful friend and spent himself unceasingly upon his patients. During his many years of a busy life in Fitzroy he endeared himself to thousands and gave of his best to the poorest of the poor, supplying not only medical skill, but medicine and nourishment. He was one of those fine characters who leave the world better for his having lived in it.

A man of fine physique, upright in his bearing, a devoted husband and father, a staunch friend, an earnest churchman, beloved by all who knew him, Will Morton's memory will be cherished by all who knew him well.

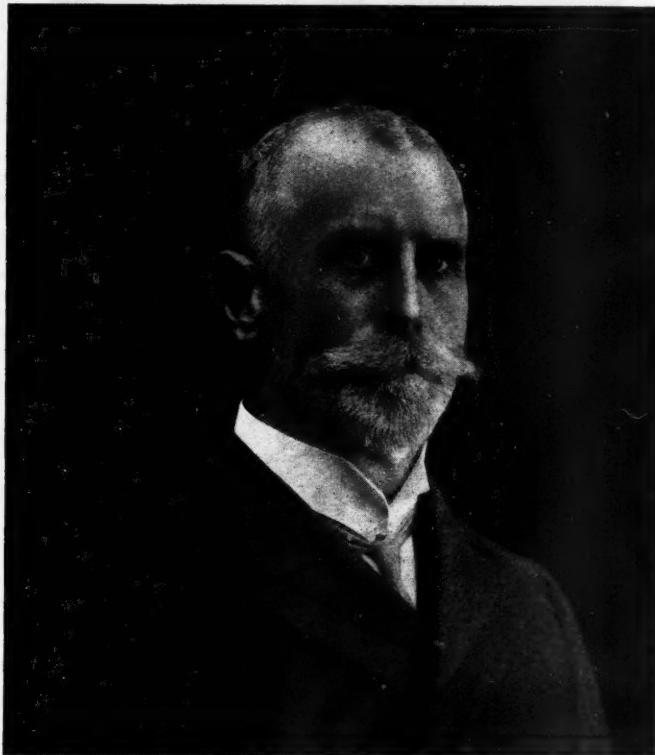
Dr. B. T. Zwar writes:

May I be permitted to add my tribute to the memory of Francis William Watson Morton whose death has removed from the

ranks of the medical profession of Victoria a distinguished exponent of his art, and a most lovable personality?

I had the privilege of enjoying his friendship for over twenty years and learned to appreciate his many sterling qualities. Tall, handsome and courteous, he inspired confidence by his appearance. To this there were added a keen devotion to duty, a constant mindfulness for the welfare of those under his care and a transparent sincerity and honesty of purpose. He was generous to a fault. Small wonder then that he was trusted and beloved by his patients, whose confidence he enjoyed to the fullest degree and retained to the end of his days.

Francis William Watson Morton was always a strong force in any movement for the advancement of the interests and for the uplifting of his profession. He became a member of the Victorian Branch of the British Medical Association as far back as 1887. He was elected to the Committee of the Medical Society of Victoria in 1903 and he became a member of the Council of the Victorian



Branch of the British Medical Association in 1906 and continued a member of this Council until 1909. He was the representative of the Victorian Branch at the annual meeting of the British Medical Association held in Sheffield in 1908.

Up to the time when deafness became a serious handicap to him, he was a regular attendant at the scientific meetings of the Branch and I well remember him as one of the first advocates in Melbourne of the open administration of ether.

He took a keen interest in all kinds of sport. In his younger days he was a keen footballer and an ardent cyclist. In his later years much of his spare time was given to gardening.

Outside his profession his chief interest was in the Church of England. From the commencement of the practice of his profession in Fitzroy in 1887 he identified himself with the work of Saint Mark's and was a member of the vestry of that church until 1893, when he joined the vestry of Saint Peter's at Eastern Hill. In 1927 he was elected by the Melbourne Synod a Lay Canon of Saint Paul's Cathedral, and he took a deep interest in all cathedral matters.

The funeral service in Saint Peter's Church was a most impressive tribute by the Church to one of its distinguished sons.

On May 11 there was dedicated in that church, by the Archbishop of Brisbane, a memorial. The walls of the sanctuary have been panelled in maple. One of the panels bears the carved inscription: "In affectionate memory of Francis William Watson Morton, a beloved physician, who in Christ, found the secret of a wise ministry of healing, and who entered into rest Sunday, January 26th, 1930, this panelling was set up. R.I.P."

Death has robbed me of a most trusted colleague and friend and the profession in Victoria is much the poorer for his passing.

Dr. Felix Meyer writes:

Francis William Watson Morton was my fellow student at the Melbourne Medical School. I remember how he stood out with his splendid physique, his great vitality, his bright, cheery nature and his generous disposition. In addition he was fearless, direct, transparently honest. He was very popular with his class.

Though he was a hard-working student and thorough in his duties, he found time for games; he played a good hand at "fives" and was a splendid footballer.

He completed his medical course in the old country and on his return began private practice. He was for many years a colleague of mine in the Gynaecological Department of the Women's Hospital, Melbourne, to which he was elected in the 'nineties. His work there was a reflection of himself, thorough, sound, conscientious. His style was free from ostentation; his methods were well considered; in all that he did or said there was a downrightness and sincerity, and a kindness and consideration for his patients.

Francis William Morton was a fine type of medical man, with a strong sense of service. He has left many affectionate memories behind him.

JOHN TALBOT BRETT.

JOHN TALBOT BRETT whose death was recorded in our issue of June 28, 1930, was born in Trichinopoly, India, on April 30, 1853. He was the eldest son of the late John Brett, Deputy Surgeon-General of His Majesty's Indian Army. He was educated at Wellington College, England, during the time that the late Archbishop Benson was head master. He passed the entrance examination for the Indian Civil Service, but failed owing to defective eyesight.

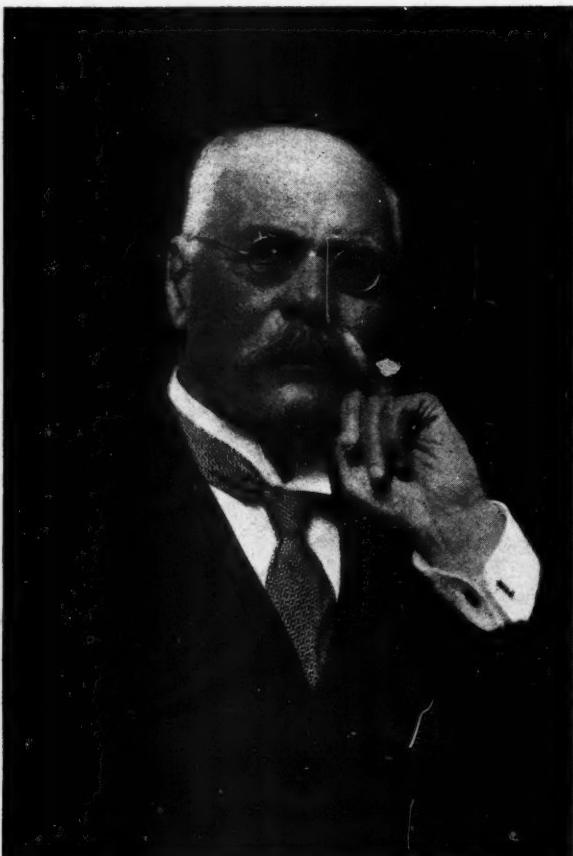
He became Licentiate of the Royal College of Physicians and Fellow of the Royal College of Surgeons, being a student at Guy's Hospital, London, where he afterwards became house surgeon and where he was associated with Mr. R. Clement Lucas, Dr. Samuel Wilks and other eminent physicians and surgeons of that time. While he was there, his father died and he had to go into general practice at Rotherham, Yorkshire, where he remained some years. He there contracted rheumatic fever and was advised to take a long sea voyage. He came to Australia and settled in practice in Melbourne. His career in Melbourne is well described by his friend, Sir Henry Maudsley.

Brett was a man of sterling worth, quiet in mien, yet forceful in character. Of men of his stamp it can be truly said that they are the backbone of the profession. They serve as examples for those that come after.

Sir Henry Maudsley writes:

It is a privilege and honour for me to express my appreciation of my friend and *confrère* of over forty years and of one who piloted me through a severe illness twenty years ago.

Brett came of a landed family in Kent whose younger sons were in the church or the services. He was born in 1853 in India at Trichinopoly within hearing of the guns, the eldest son of the Deputy Surgeon-General of the Indian Army. His mother died at his birth. At three years of age he was sent to England and lived with his paternal aunt, Mrs. Golding Bird, whose son was afterwards surgeon to Guy's Hospital. Brett was educated at Wellington College when Benson (afterwards Archbishop) was head master, a severe but just disciplinarian. After a brilliant career at school his ambition was the Indian Civil Service. He attended some lectures at University College, London, and gained a high place in the competitive examination for the higher grade of the Indian Civil Service. Fate was against his Indian career, for he was rejected by the Medical Board on account of his sight and some affection of the heart. He then



became a medical student at Guy's Hospital where he had a successful career, filling the junior posts, and seemed likely to become a member of the staff and to follow a London career, but again the fates were against him, for his father died, leaving three sons by his second marriage, and Brett had to give up his idea of a London career and to earn money at once. He settled at Rotherham, Yorkshire, built up a large practice, but after some years an attack of rheumatic fever compelled him to seek a milder climate, and he came out to Melbourne in 1884. He practised in Collins Street, was physician to outpatients at the Melbourne Hospital and Director of the State Government Calf Lymph Dépôt. As director he organized the dépôt and made it a most efficient department. With Federation the institution went out of the State control and Brett was superseded.

In 1889 he went to Europe to study pathology and hygiene. On his return he devoted himself to pathology, was pathologist to the Alfred Hospital and with Dr. Mollison to the Coroner. He was examiner in medical jurisprudence at the Melbourne University. His opinion on pathological specimens was much valued by his *confrères*. He was President of the Victorian Medical Society, a member of the Victorian Medical Board and of the Medical Benevolent Society. Brett was a man of high principles, of wide culture and of great natural ability. His tastes were catholic. His early education, the traditions of Guy's had great influence in his career in Melbourne in maintaining and advancing the tone of the profession. Of a retiring disposition, he rarely spoke in public, but he was a fluent speaker, humorous and precise. He was a member of the Melbourne Club and until a few years ago a member of the Wallaby Club.

A man of powerful build, of fine presence, he was always somewhat crippled by his heart and for the last fifteen years had slowly progressive renal disease which ended in heart failure and uræmia. He continued his routine work until three months before his death. The medical profession was all the better for his life in Melbourne.

Dr. David Grant writes:

As one of the oldest professional colleagues of the late John Talbot Brett, it is fitting that I should write a few words about our association during the last forty-three years. I first met him in 1884, when I first arrived in Melbourne, but at that time I passed on to Sydney and did not see him again until 1887, when I took up practice in Collins Street. Since then we have maintained a friendship, uninterrupted by even a passing cloud of misunderstanding, a fact upon which I look back with very great pleasure and some pride. Our professional association was but scanty, but on those occasions when I referred to him, exclusively on points of clinical pathology, I invariably profited by his admirable reports. Others will probably speak of his technical attainments and of the various appointments he held, but I can testify with great confidence as to our relations as friends which were those of unbroken harmony from first to last. Living near each other in Collins Street, we met for a good many years almost daily and our relations at all times were most friendly and congenial. Apart from his technical endowments, he was exceedingly well informed on general topics and at all times *au fait* with social and political developments of any importance. During recent years his range of activity became somewhat limited, but notwithstanding his diminishing physical powers he courageously persevered with his pathological work till within a few weeks of his death.

His passing suggests reflections on the remarkable sequence of deaths of Melbourne medical seniors within a very few years, to which I can remember no parallel during the forty-three years which I have spent in this city. The names of Adam, Stirling, Bird, Ryan and Syme immediately recur to the memory, and especially those of the last three, in all of whose cases it is practically certain that the strain of war work and still more the sequelæ of acute illness thereby induced, played a very grave part.

Now that our friend Brett has answered the last call, we can cherish the memory of a genial personality, a man of unblemished honour, a highly informed mind, sound judgement and intellectual honesty and one who at all times lived up to the highest ideals of our profession. As for those nearer to him, "the heart knoweth its own bitterness," but they may take what comfort they can from what I have just set down as the unanimous verdict of his colleagues and from the confident assurance that his whole life permits us to apply to him Tennyson's splendid eulogy of Hallam:

And thus he bore without abuse
The grand old name of gentleman,
Defamed by every charlatan,
And soiled with all ignoble use.

The College of Surgeons of Australasia.

FEES IN PRIVATE PRACTICE.

THE Honorary Secretary of the College of Surgeons of Australasia has forwarded the following statement to prevent misunderstanding of the rules of the College governing the conduct of Fellows in regard to fees in private practice.

Every Fellow of the College has signed a pledge that he will not practise division of fees, either directly or indirectly, in any manner whatsoever. At the second annual general meeting in Sydney in March, 1929, the Council of the College was instructed to draw up rules governing the conduct of Fellows in regard to fees. At the third annual general meeting in Melbourne in March, 1930, nine rules were adopted. These were published in THE MEDICAL JOURNAL OF AUSTRALIA, June 7, 1930, on page 762.

These rules are in no way intended to influence members of the profession who are not Fellows of the College, regarding the fees which they should charge for their services. This is no concern of the College. The rules are intended to prevent direct or indirect fee splitting and the practice of giving secret commissions by indicating to Fellows the fees which they may collect from the patient and forward to other practitioners for services rendered. In rendering accounts Fellows must state the exact fees due to the anaesthetist and assistant and for other necessary services at the operation.

It has been suggested that the College desires to limit anaesthetists' fees. This is incorrect. The College desires to prevent that indirect form of fee splitting whereby an anaesthetist is paid a portion of the operation fee by a surgeon as a reward for sending the patient to that surgeon. The rules forbid Fellows of the College to collect from the patient and pay to the anaesthetist a fee larger than one-eighth of the operation fee or, alternatively, larger than five guineas. If the anaesthetist's fee is larger than the greater of these amounts, the anaesthetist must render his own account to the patient on his own account form. A similar rule applies for the fee to be paid by the surgeon to an assistant at an operation.

The College rules do not prohibit the delegation of post-operative treatment to another practitioner, but do not allow the surgeon to collect the fee for this post-operative treatment from the patient and pay it to the practitioner concerned. The fee for the post-operative treatment must be collected from the patient by the practitioner who conducts this treatment. When this is done, no suspicion of indirect fee splitting can be aroused.

The College possesses disciplinary powers over its Fellows which it will not hesitate to exercise in cases in which a violation of these rules has been committed.

Correspondence.

MODERN VIEWS ON SOME OBSTETRICAL AND GYNÄCOLOGICAL PROBLEMS.

SIR: A cursory glance at the statistics shows that the percentage of "absolute cures" obtained by treating carcinoma of the *cervix uteri* with radium and by surgery is very little different (20% to 25%). It is therefore only natural that Dr. Worrall and other experienced surgeons are very loath to abandon their surgical operation for radium until they can be convinced that their results are inferior to those obtained by radiation.

In his criticism of Dr. Wilson's papers he draws attention to the rapidity of recovery after Wertheim's operation, but not to the length of time the patient has been in bed in hospital (with its consequent cost of upkeep) compared with the length of time occupied by the radium case, while he makes no mention of the comparative amount of pain suffered by the patient as a result of the two treatments. Again Dr. Worrall does not stress the psychical effect of a major operation (with its high mortality rate) as opposed to treatment by radium in regard to the patient reporting for treatment at an early stage of the disease.

He points out that the mortality rate of operation of 15% to 20% is high and it must be remembered that this is in the hands of the world's foremost surgeons skilled in Wertheim's operation. Sir Victor Bonney himself admits that his own operation mortality rate is lower now than it was ten years ago, so we can only guess at the mortality rate in the case of the younger surgeon endeavouring to perfect his technique in Wertheim's operation.

Last year, while abroad, I not only had an opportunity of seeing carcinoma of the cervix treated by both radiologists and surgeons, but was fortunate enough to have access to the latest literature on the subject.

The latest figures I could find relating to Victor Bonney's work were as follows. The number of cases seen was 420. The number of cases operated on was 265 (63%), with a primary mortality of 14%. The percentage of "relative" cures was 39.6, while that of "absolute" cures was 25 (there were 21 cases lost sight of in this series). This shows that Bonney's "relative" cures are 39.6% and not 50% as mentioned by Dr. Worrall.

It offers food for thought to note also that in a series of 214 cases published in 1926 by Victor Bonney, 34 died of the operation and in 14 of these, i.e., 41.1%, the glands excised were not carcinomatous.

It is interesting, however, when looking at the other side of the picture, to learn that between the years 1920-1929 there were only 15 cases of carcinoma of the cervix operated on in the whole of Sweden, all other cases of this type being referred for treatment to a radiologist, Dr. J. Heyman.

Between 1910-1923 this worker had treated 737 cases with a primary mortality of 1.19% and an "absolute" cure rate of 23.1%. All these cases were in Heyman's opinion inoperable and it is only reasonable to conclude that had they applied for treatment at an early stage the low mortality rate would have been lower still and the "absolute" cure rate higher too.

In conclusion, it must not be forgotten that the technique of hysterectomy has reached its limit. To improve the surgical results a technique which aims at the removal of more affected tissue must be devised and seeing that the present surgical mortality is due to the extensiveness of the operation, this is unlikely. Radium treatment, however, is only in its infancy (it was first used in the treatment of carcinoma of the cervix 22 years ago) and the use of intraperitoneal radium and "radium at a distance" may make the future for radium treatment very bright.

In regard to the second half of Dr. Worrall's letter it is illuminating to know that in the five-year period 1921-1926 at University College Hospital, London, 68 cases of menorrhagia at the menopause were treated by radium.

It is claimed that of these 62 were cured and it must not be forgotten that in this series there were four cases lost sight of.

Yours, etc.,

HUBERT K. PORTER.

"Clarinda," Darling Street, Balmain.

July 12, 1930.

SIR: Published under the above caption Dr. K. Wilson's attitude towards the treatment of carcinoma of the uterine cervix has met with adverse criticism at the hands of Dr. Ralph Worrall. I am rather astonished that the latter's letter (*THE MEDICAL JOURNAL OF AUSTRALIA*, July 12, 1930) has not provoked a polemical defence of Dr. Wilson's "modern views."

Without taking either of them too literally the issue may be thus stated. Dr. Wilson considers surgical eradication to be such a crippling procedure that it should give place to radiotherapy, whereas Dr. Worrall denies that the survivors of operation are anything but well and happy and challenges the alleged superiority of radiation.

My own view coincides with that of Dr. Wilson and I am proceeding to teach it. Nevertheless, for radiotherapy of the cancerous cervix to prosper in this country it will be necessary to overcome the antagonism of Dr. Worrall, who justly enjoys a preeminent authority in gynaecology.

It cannot be gainsaid that at best those persons who survive the Wertheim operation are very seriously mutilated, being as they are *sans* ovaries, *sans* uterus, *sans* upper half vagina. At the worst they suffer from urinary fistulae and various other disabilities that need not be further specified. Under these circumstances perfection may be often attained in the performance of "domestic duties," but of "wifely duties" never.

All honour to Wertheim and his followers (of whom I claim to be one) who have succeeded in the salvage of human lives by heroic surgery! Nowadays, however, expert radiotherapy must be credited with results at least equal to those obtainable by surgery and with infinitely less sacrifice.

So much am I impressed with the truth of this assertion that I have practically abandoned the Wertheim operation and am striving to perfect my technique in Curie-therapy.

The advantages of radium therapy are these: (i) It does not deter patients from seeking advice, (ii) it is applicable to almost all patients presenting, (iii) it is devoid of primary mortality and mutilation, (iv) its technique is much easier of acquisition than is operative skill, (v) its results are rapidly improving. The best radium practice can show a 20% absolute cure rate and 40% for operable and border-line cases.

Dr. Worrall credits Victor Bonney with 50% permanent cures following operation. The basis of this misleading computation is Bonney's private practice in which he obtained thirty-eight five-year survivals out of eighty-three operated.

Actually his consolidated figures closely approximate the average of a number of foremost operators, namely, 23.4% absolute cure rate and 38.7% for operable and border-line cases.

At the Austin Hospital, Heidelberg, I have opportunities of seeing the heinous end results of untreated and ineffectively treated uterine cancer and I not uncommonly reflect how inadequate is our crusade against this dread affliction. A 20% absolute cure rate for all treatments is not a very brilliant achievement!

In order to emphasize the present state of affairs I intend to utilize the gynaecological clinic at the Alfred Hospital on the evening of September 17 for a demonstration to the British Medical Association of as many phases of the problem as is possible.

Yours, etc.,

ROBERT FOWLER.

85, Spring Street, Melbourne.

July 28, 1930.

DIATHERMY OF TONSILS.

SIR: After reading Dr. Garnet Halloran's letter in the Journal of July 26 and the cable he received from Professor Portmann, of Bordeaux, regarding the method he usually employs in removing tonsils, I looked up Dillinger's original article on the technique of tonsil electro-coagulation (diathermy), in which he refers to Professor Portmann in the following passage:

There is a very large number of diseased tonsils that cannot or should not be treated by tonsillectomy, such as those of patients having hemophilia, tuberculosis, nephritis, heart lesions, high blood pressure, syphilis *et cetera*, and there is a tremendous number of adults with diseased tonsils who refuse operation. If electro-coagulation was used only in this large group of cases, it is a method that we should be extremely happy to welcome. It was in such cases that I first saw diathermy used by Professor Georges Portmann, of Bordeaux, and who has been using it with splendid success since 1913. My experience and technique were secured there during the summers of 1924 and 1925. After treating more than 150 patients during the past year, I have now adopted it as my routine tonsil operation and feel that I can say, modestly, that I know something about it and its results.

When I read this portion of Dillinger's article stating that he had adopted diathermy as his routine method of removing all adult tonsils after being so impressed with Professor Portmann's technique and results, and, as Portmann had been using diathermy for removing tonsils since 1913 (a period of seventeen years), I naturally concluded (and, I think, quite justifiably) that Portmann himself had adopted diathermy as his routine method of removing all adult tonsils. Hence my statement to this effect in my letter to the Journal of July 5. However, in the light of the cable that Dr. Halloran has recently received from Professor Portmann, the latter apparently still uses the dissection method for removing the majority of adult tonsils, probably because it is a much quicker method, and reserves diathermy for the more difficult cases and those in the large group mentioned by Dillinger in which surgical tonsillectomy is either contraindicated or refused.

The very fact, however, that diathermy can be quite safely used for removing tonsils in hemophiliacs and other cases where it would be courting disaster to attempt to remove them surgically, seems to me to establish at once the superiority of diathermy over surgical tonsillectomy and to provide a very strong argument for its adoption as the routine method of removing all adult tonsils painlessly and bloodlessly under local anaesthesia and thereby robbing tonsillectomy of two of its chief terrors for the lay mind, namely, the fear of a general anaesthetic and haemorrhage.

Only yesterday I read in one of the daily papers that a youth of nineteen, after having had his tonsils removed surgically by a well known specialist in one of our capital cities, died from asphyxiation through blood entering his larynx and bronchial tubes a few minutes after the operation was completed and when he was about to be removed from the operating theatre. In the May number of *The Journal of Laryngology* (page 373) I also read of a case recently reported by one of the leading specialists in England of a healthy woman of thirty-one who developed an acute gas bacillus infection in the side of her face and neck following on surgical tonsillectomy. She became acutely ill within thirty-six hours after the operation and despite strenuous efforts to save her life, including blood transfusion and intravenous saline, she died twelve days later. Such tragedies as these following on surgical tonsillectomy, particularly in adults, are occurring every week in some part of the civilized world and they could not possibly happen if diathermy were used to remove all adult tonsils under local anaesthesia, owing to its being an entirely bloodless procedure and because diathermy has the very great advantage of sealing off all the blood vessels and lymphatics in the area that has been coagulated or desiccated and thus preventing the possibility of any spread of infection into the peritonsillar or cervical tissues.

The current from any modern diathermy machine is under such perfect control that every particle of tonsil tissue can be quite safely removed by diathermy, leaving a perfectly smooth and flexible tonsil fossa, with the pillars in their natural state without a sign of scar tissue on them, with no dryness of the throat or the slightest impairment of either the speaking or singing voice that so frequently follows surgical tonsillectomy no matter how skilfully performed. Our patients can be freed from their focal infections and constitutional symptoms without being exposed to the dangers of a general anaesthetic or severe haemorrhage, without the necessity of staying in hospital at all or losing a single day from their employment and yet they have been subjected to nothing more serious than an occasional sore throat.

Yours, etc.,

A. J. CAHILL.

Sydney Buildings, Canberra, F.C.T.
July 28, 1930.

RADIOLOGY AS A SPECIALTY.

SIR: During question time after Professor Evarts Graham's lecture last night, Professor Graham stated that the Melbourne radiologists asked for his opinion as to the future of radiology as a specialty. The Professor had replied that, as he was not a radiologist himself, he did not feel qualified to express an opinion; but he had warned them that the downfall of radiology as a specialty would undoubtedly be hastened if radiologists allowed themselves to give subsequent advice to the patients. He mentioned one instance where the radiologist had said to the patient, after a cholecystographic examination, "You'll have to lose your gall bladder," even though the only information the radiologist had was that furnished by the cholecystograms.

On behalf of the Radiological Section of the New South Wales Branch of the British Medical Association I wish to give an assurance that we hold that it is no part of a radiologist's work to discuss treatment with the patient. In my rooms we refrain from discussing with the patient even the radiological findings. Personally I have always held that a radiological examination is merely a portion of a general examination, undertaken at the request of the medical attendant to enable him to include the radiological findings with the information elicited by clinical methods, so that he may make his ultimate diagnosis as accurate as possible.

All will, I think, admit that sometimes the radiological findings are such as to clinch the diagnosis. We radiologists in turn freely admit that in some cases our findings do not agree with clinical findings and the attendant physician or surgeon must make his ultimate diagnosis even, if necessary, against the evidence obtained radiologically.

I think and hope that the other members of our Section agree with me that ultimate diagnosis, treatment and prognosis should be left to the physician or surgeon absolutely; I hope, too, that those who have been willing hitherto, when asked, to acquaint the patient with the radiological findings, will learn to restrain their enthusiasm and leave the attendant physician or surgeon to do this if he should deem it advisable.

Yours, etc.,

WILFRED B. DIGHT,
President of the Section of Radiology,
New South Wales Branch of the British
Medical Association.

135, Macquarie Street,
Sydney.
July 29, 1930.

VISIT OF PROFESSOR J. T. WILSON.

At the conversazione to be held at the Medical School, University of Sydney, on August 29, 1930, in connexion with the visit of Professor J. T. Wilson, the following

lecturettes will be given: "Microscopic and Ultra-Microscopic Causes of Disease," by Professor D. A. Welsh; "Some Methods of Resuscitation," by Professor G. W. Davies; "The History of the Discovery of the Malarial Parasite," by Dr. Harvey Sutton. The Canti film will be shown by Dr. H. G. Chapman.

Books Received.

BIRTH CONTROL ON TRIAL, by Lella Secor Florence, with a foreword by Sir Humphry Rolleston, Bart., K.C.B., M.D., F.R.C.P., D.Sc., D.C.L., and an introductory note by F. H. A. Marshall, Sc.D., F.R.S.; 1930. London: George Allen and Unwin Limited. Sydney: Angus & Robertson. Crown 8vo., pp. 160. Price: 6s. 6d. net.

AN INTRODUCTION TO PHYSICAL ANTHROPOLOGY, by E. P. Stibbe, F.R.C.S.; 1930. London: Edward Arnold & Company. Demy 8vo., pp. 208, with illustrations. Price: 12s. 6d. net.

Diary for the Month.

AUG. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 AUG. 27.—Victorian Branch, B.M.A.: Council.
 AUG. 28.—New South Wales Branch, B.M.A.: Branch.
 AUG. 28.—South Australian Branch, B.M.A.: Branch.
 SEPT. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 SEPT. 2.—New South Wales Branch, B.M.A.: Post-Graduate Work Committee.
 SEPT. 3.—Victorian Branch, B.M.A.: Branch.
 SEPT. 4.—South Australian Branch, B.M.A.: Council.
 SEPT. 5.—Queensland Branch, B.M.A.: Branch.
 SEPT. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
 SEPT. 10.—New South Wales Branch, B.M.A.: Last day for examination of two candidates for election to Federal Committee.
 SEPT. 11.—New South Wales Branch, B.M.A.: Clinical Meeting.
 SEPT. 11.—Victorian Branch, B.M.A.: Council.
 SEPT. 11.—Queensland Branch, B.M.A.: Surgical Section.
 SEPT. 12.—Queensland Branch, B.M.A.: Council.
 SEPT. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments.

Dr. F. C. Turnbull (B.M.A.) has been appointed Second Assistant Medical Superintendent at the Hospital for the Insane, Goodna, Queensland.

Dr. A. A. Palmer (B.M.A.) has been appointed a Member of the Dental Board of New South Wales for a period of three years from July 1, 1930.

Dr. C. E. Percy (B.M.A.) has been appointed Medical Officer at the Office of the Director-General of Public Health, New South Wales.

Dr. F. E. Costigan (B.M.A.) has been appointed Public Vaccinator at Yea, Victoria.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

BURREN JUNCTION MEDICAL COMMITTEE, NEW SOUTH WALES: Medical Officer.

ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES: Resident Medical Officer, Junior Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officer.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Resident Medical Officer.

THE UNIVERSITY OF MELBOURNE: Beaney Scholar in Pathology.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino, Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Mount Isa Hospital. Boonah Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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